



**Computer & Communications
Industry Association**
Tech Advocacy Since 1972

CCIA's Submission to the UK Competition & Markets Authority

Online Platforms and Digital Advertising Market Study

July 30, 2019

1. Introduction

The Computer and Communications Industry Association (CCIA) welcomes the opportunity to submit comments to the UK Competition & Markets Authority (CMA) relating to the market study on “online platforms and digital advertising market study.”

CCIA represents large, medium, and small companies in the high technology products and services sectors, including computer hardware and software, retail, telecommunications, and Internet products and services.¹ Our members employ more than 750,000 workers and generate annual revenues in excess of \$540 billion. CCIA remains committed to protecting and advancing the interests of our members, the industry as a whole, as well as society’s need to benefit from the positive contributions that digital technologies can make.²

CCIA’s members are leading innovators of what some refer to as the ‘digital economy’. Some operate so-called multi-sided business models, where it is often the advertising revenue generated on one side of the business that funds the innovations valued by consumers. Many advertising services offered by CCIA’s members create benefits and efficiencies for both consumers and advertisers alike.

There are numerous stakeholders that play an important role in the advertising sector since the Internet has offered a plethora of new, digital advertising opportunities including to those actors that have previously operated solely offline. When analyzing the digital advertising industry, we encourage the CMA to focus on all relevant stakeholders, as opposed to focusing exclusively on the so-called “digital platforms”, a term which encompasses a great variety of business models that operate in its own unique form in numerous and different on-line and off-line sectors.

CCIA’s analysis of the advertising industry demonstrates that the advertising market has never been as dynamic as it is today with many online as well as offline channels fiercely competing for advertisers’ money. Vigorous competition produces winners and losers, especially when the economy is undergoing a digital transformation which impacts nearly all industries. The resulting risk is that in reaction to some of the transformations that are currently taking place, competition authorities may take a dim view of conduct that is actually pro-competitive, innovative and typically benefits consumers. We encourage the CMA to take these points into account, particularly as the CMA appears to have already determined pre-formulated remedies without seeking evidence in this market study as to whether there is, in fact, any need to propose such remedies. CCIA also remains open to continuing to engage with the CMA as it conducts this market study as well as upon its completion, should the CMA continue to see challenges that would require remedial action.

¹ A complete list of CCIA’s members can be found here: <http://www.ccianet.org/about/members/>.

² A complete summary of CCIA’s mission statement can be found here: <http://www.ccianet.org/about/ccias-mission/>.

2. Theme 1: Competition in the supply of digital advertising in the UK

The Advertising Industry Dynamics

Competition for advertising revenue, remains fierce between mediums such as online and offline advertising. Therefore, any competition analysis in this sector should comprise relevant stakeholders that include online and offline mediums.

Advertising has historically been used by many businesses, including multi-sided business models such as newspapers to financially support non-advertising services such as news media, television, social media or search engines. These business models that have long existed garner greater attention in the digital world thanks to innovation that has made advertising a more valuable tool for consumers and businesses.

According to David Evans, Visiting Professor at the University of Chicago and University of College London and Executive Director of the Jevons Institute for Competition Law and Economics, 24 percent of a 100-dollar advertising campaign is spent online, while the rest is spent on television, print, outdoor/billboard, radio and other advertising vehicles.³ As Evans puts it, “advertisers base decisions about the level and allocation of their budgets on formal or informal analyses of the rate of return on investment”.

Targeted advertising, which is advertising that allows companies to present an ad campaign to a relevant audience, is found both online and offline; this creates higher efficiencies for advertisers in addition to increased consumer welfare, since consumers prefer personalized and relevant ads.⁴ As a result, targeted advertising has spread to mediums such as television and billboards.

Tyler Cowen, professor of economics at George Mason University, argues that not only is advertising competitive across formats, but that companies like Google and Facebook are helping disrupt monopolies in other sectors:

[T]hen there's the digital advertising industry that the two companies lead. But that's not a monopoly, either: Google as an advertising platform still competes with Facebook, television, radio, circulars, direct mail and, for that matter, e-mail and word of mouth. Insofar as Google has taken a big share of the ad market, it is because its ads are cheaper and better targeted than alternatives. When it comes to ads, Google is fundamentally a price-lowering institution for small and niche businesses that can now afford more reach for less than ever before. By boosting small startups elsewhere in the

³ David Evans, *Antitrust Issues Raised by the Emerging Global Internet Economy*, 102 Northwestern U. L. Rev. Colloquy 285 (2008)
https://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=1095&context=nulr_online.

⁴ Holly Pauer, *71% of Consumers Prefer Ads*, Adlucent (May 12, 2016), <https://www.adlucent.com/blog/2016/71-of-consumers-prefer-personalized-ads>.

*economy, Google and Facebook actually serve as major forces acting against monopolies in other sectors.*⁵

New technologies and innovation will continue to disrupt the advertising marketplace. For example, television advertising will increasingly take advantage of new tools such as granular set-top box data to personalize ads to the viewer.⁶ It is important, therefore, to acknowledge that the advertising sector comprises of online and offline channels and that new mediums will have to be taken into account as innovation continues to open new mediums for advertising campaigns to be launched. In essence, advertising depends essentially on consumers' attention, and companies engaging in advertising campaigns compete for attention across a variety of channels including some of which were unthinkable years ago, e.g. digital billboards or streaming music.

In addition to competition between online and offline advertising, even within the digital advertising sector, operators compete with a variety of services for user attention in the digital space, all of which have the opportunity to display relevant advertising. This includes services such as messaging, gaming, streaming, various search engines, social media, and video, some of which can be displayed on various mediums including desktop, mobile, and with new mediums appearing regularly.

Improved Consumer Experience

Online advertising is able to compete with traditional advertising because it has generated advantages for businesses and end consumers alike. The advertising business model that characterizes many digital companies helps to ensure that the right incentives exist for these companies to continue to invest in providing consumers with a positive experience. Advertisers value digital advertising platforms because they reach many people; in turn, these platforms reach many people because they provide highly desirable content or services. And this is possible thanks to the financial support many of these companies obtain from digital advertising, which they in turn invest in R&D.⁷

Digital advertising has become a more personalized advertising channel thanks to behavioral advertising powered by data analytics. In fact, targeted advertising is now ubiquitous throughout the digital advertising space (and increasingly throughout advertising), offering businesses a more efficient channel for reaching out to interested customers. At the same time, individuals receive relevant advertising tailored to their own needs. In fact, many online

⁵ See Tyler Cowen, *Breaking Up Big Tech Would Be A Big Mistake*, The Globe & Mail (Apr. 12, 2019), <https://www.theglobeandmail.com/opinion/article-breaking-up-big-tech-would-be-a-big-mistake/>.

⁶ See e.g. Jeanine Poggi, *Here's How AT&T's Xandr and Turner Plan to Work Together in 2019*, AdAge (Jan. 8, 2019), <https://adage.com/article/media/xandr-turner-plan-fix-tv-advertising-2019/316160>; Sara Fischer, *The future of TV advertising is here--and it involves targeting the specific interests of viewers*, Business Insider (Jan. 25, 2019), <https://www.businessinsider.com/future-of-tv-advertising-targeting-the-specific-interests-of-viewers-2019-1>.

⁷ David Balto, *Internet Search Competition: Where Is The Beef?* DC Antitrust Law (June 24, 2011), <http://www.dcantitrustlaw.com/assets/content/documents/googlesearchfinal-Balto.pdf>.

businesses offer customers the possibility to tailor their ads to their preferences and often give customers the ability to opt-out. For publishers, digital advertising has become a key revenue stream for them; Plum Consulting estimates that publishers receive on average £0.62 of every pound an advertiser spends on programmatic display advertising.⁸

Therefore, the digital economy has improved the advertising experience for all stakeholders involved and ushered in competitive pressure to the entire advertising marketplace to evolve. Thanks to ad-supported business models, consumers enjoy goods and services for a lower cost, often times even for free. Through this model, customers are also able to have access to ad campaigns in the digital space for a lower price, since advertising offers have increased in the digital space and more competition brings tailor-made offers to advertisers and individuals willing to advertise themselves.

Studies have shown that consumers often prefer to receive ads instead of paying for online services. For example, as recently highlighted by the United States Department of Justice Assistant Attorney General Makan Delrahim, nearly 80 percent of respondents in one study reported in Recode represented that they would choose an ad-supported Facebook over paying \$1/month.⁹ Furthermore, thanks to the investments in technology, consumers usually receive advertising relevant to them, as targeted advertisements have become extremely accurate. A more personalized experience as a result of targeted advertisements is highly valued by consumers.¹⁰

Advertisers continue to purchase advertising on various media operators which serve different purposes. However, it is important to bear in mind that different advertising channels often compete against each other. Therefore, it is important not to analyze this medium (digital) in an isolated bucket — a convergence of the different channels is actually what is taking place in reality, as further explained below.

3. Theme 2: Consumer Control Over Data Collection Practices

Use of data collection and data analytics to accurately provide consumers with a personalized experience is a distinguishing characteristic of the digital advertising space and is attracting the attention of many competition authorities. Each company operating in the various relevant

⁸ See Plum Consulting, *Online Advertising in the UK* (2019), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/777996/Plum_DC_MS_Online_Advertising_in_the_UK.pdf; Gerry Smith & Mark Bergen, *Google Sweetens Deal with Publishers*, Bloomberg (Mar. 20, 2018), <https://www.bloomberg.com/news/articles/2018-03-20/google-said-to-sweeten-deals-with-publishers-as-tech-woos-media>.

⁹ Makan Delrahim, *Assistant Attorney General Makan Delrahim Delivers Remarks at the Antitrust Division's Public Workshop on Competition in Television and Digital Advertising*, U.S. Dept. Justice (May 2, 2019), <https://www.justice.gov/opa/speech/assistant-attorney-general-makan-delrahim-delivers-remarks-antitrust-divisions-public>.

¹⁰ *Id.*

sectors has its own specific data collection policy to secure consumers own their information. Data collection is not unique to digital businesses, and, to some extent, all businesses collect data which is subject to different regulations in the EU. Hence, the CMA should be cautious in its consideration for the need for additional (and different) approach to data collected by digital services, and whether such different approach to digital businesses would create asymmetries that could negatively impact the economy as a whole.

CCIA believes it is very important to understand the role that customer data plays in the digital advertising sector, as explained in the following section. Because the tech industry takes very seriously the protection of consumer data CCIA would welcome the possibility to work with the CMA to address any concerns it may have with respect to data collection beyond the explanations CCIA provides in this filing.

4. Theme 3: The market power of online platforms in consumer-facing markets

Online Advertisers Compete with Offline Advertisers

As explained in the previous sections of this submission, companies both in the online digital advertising space compete face to face with those in the offline digital space.¹¹ There are no frontiers between online and offline advertising outlets. Target TV ads allow those formats to compete with digital ads, while online ads have many formats that provide TV-style brand advertising (video, banner ads, masthead takeovers).¹² Further, the advertising on an offline outlet (like a TV ad) could solicit an immediate online response (i.e. a brand search), further amplifying the effect of an online marketing campaign.¹³ Consumers' tendency to multitask or multi-home facilitates cross-platform responses to advertising.

¹¹ See Ty Ahmad-Taylor, Vice President of Business Product Marketing, Facebook, Remarks at the Public Workshop on Competition in Television and Digital Advertising by Dept. of Justice (May 2, 2019), <https://www.justice.gov/atr/public-workshop-competition-television-and-digital-advertising> (“In competition for advertising dollars at each stage of the funnel, we view that we [Facebook] are a likely substitute or a swap for both television, for print, for cable advertising, and for other types of media or billboards even that might compete for your attention.”).

¹² See, e.g., Molly Wood, *Targeted ads aren't just online, they're on TV*, Marketplace (Feb. 19, 2019), <https://www.marketplace.org/2019/02/19/if-you-thought-targeted-ads-were-only-happening-online-you-better-turn-your-tv/>.

¹³ See Rex Yuxing Du, Linli Xu & Kenneth C. Wilbur, Immediate Responses of Online Brand Search and Price Search to TV Ads, 83 J. Mktg. 81 (July 1, 2019), <https://journals.sagepub.com/doi/abs/10.1177/0022242919847192> (noting study results that show TV ads lead to a variety of immediate online responses); Jura Liaukonyte, Thales Teixeira, & Kenneth C. Wilbur, Television Advertising and Online Shopping, 34 Mktg. Science 309 (Jun. 2015), <https://pubsonline.informs.org/doi/abs/10.1287/mksc.2014.0899> (demonstrating that TV advertising does influence online shopping); Mingyu Joo, Kenneth C. Wilbur, Bo Cowgill & Yi Zhu, Television Advertising and Online Search, 60 Mgmt. Science 1 (Jan. 2014), <https://pubsonline.informs.org/doi/10.1287/mnsc.2013.174> (showing that TV ads for financial services brands increase both the number of related Google searches and searchers' tendency to use branded keywords instead of generic keywords).

The Internet has enabled consumers to easily switch or “multi-home” across different advertising platforms. A consumer who uses a news aggregator, for instance, may not consistently go to only a specific publisher’s website to read news but rather visit multiple sources either directly, through news aggregators like Drudge Report, via search results, social media, or other means. The consumer switching generates means that the advertiser may not reach some consumers through one particular approach,¹⁴ which creates an incentive for advertisers to further innovate to keep marketers on their advertising platform.

Therefore, online advertisers and more traditional advertisers on radio, television and other types of media, are converging with respect to their advertising campaigns.¹⁵ To this end, companies that invest in R&D and data analytics can innovate and create greater value by maximizing the accuracy of targeted advertising across online and offline outlets.

Data Access Does Not Make Companies Immune to Competition

Some have suggested, based on the notion of an endless, positive feedback loop, that the more data are collected, the better the companies’ products become, which in turn attracts more users who then generate more data. The result is a supposedly insurmountable data advantage that keeps companies immune from competition. It is true that data may well enable a company to improve its products if it knows how to derive meaningful insights from it. That, however, can hardly be a competition concern. Two leading economists, Lambrecht and Tucker, put it very clearly:¹⁶

[T]he history of social networking sites suggests that big data has not protected larger firms in this industry. Rather, this industry has experienced a succession of large firms, even though at each point in time the incumbent had access to big data whereas the new entrant was, in terms of data availability, at a disadvantage.

Therefore, when discussing how companies use data, it is important to consider that Internet companies have successfully entered established markets *prior to* acquiring access to big data. For example, companies like Airbnb, Uber, and WhatsApp leveraged a simple insight about a mobile device-user’s needs to enter markets where incumbents already had access to data.¹⁷

¹⁴ See Suan Athey, Emilio Calvano & Joshua S. Gans, The Impact of Consumer Multi-homing on Advertising Markets and Media Consumption, 64 Mgmt. Science 1477 (Apr. 2018), <https://pubsonline.informs.org/doi/10.1287/mnsc.2016.2675>.

¹⁵ Christina Beaumier, Vice President Product, TV Platform at Xandr, Remarks at the Public Workshop on Competition in Television and Digital Advertising by Dept. of Justice (May 2, 2019), <https://www.justice.gov/atr/public-workshop-competition-television-and-digital-advertising> (“There is no doubt that national traditional TV is converging with digital video. And this starts with the consumer and how she is consuming content across all different devices.”).

¹⁶ Anja Lambrecht & Catherine E. Tucker, *Can Big Data Protect a Firm from Competition?*, CPI Antitrust Chronicle 7 (Jan, 2017), <https://www.competitionpolicyinternational.com/wp-content/uploads/2017/01/CPI-Lambrecht-Tucker.pdf>.

¹⁷ Id.

Other examples from recent history include Snapchat, Tik Tok, and Slack, all of which gained hundreds of millions of users despite starting with no data. A more recent example is Handshake — a LinkedIn competitor that focused on college students and recent grads — that convinced 14 million users to join their platform with an innovative idea.

Proposals to classify data as an essential input are unfounded and rest on a misunderstanding of the concept of data that is, among other things, non-rivalrous and non-exclusive. One firm collecting data does not impede on another firm's ability to collect data. An advertising platform can so easily obtain consumer data that the data that one player holds hardly excludes others from entering the market. Incumbent online providers do not have exclusive domain over user data, nor do they have exclusivity clauses in terms of service with users.¹⁸ Because data moats are an "empty promise" that "erodes as the corpus grows," as famed venture capitalist Andreessen Horowitz explained, entrants with new ideas that gain popularity can quickly gain data for themselves.¹⁹

Moreover, companies can also purchase data through third party services, in addition to collecting data directly themselves. And whilst much of the media focus is on digital platforms, it often goes unnoticed that established media groups such as News Corp have a significant amount of data and are major competitors in advertising. In fact, when News Corp acquired Unruly in 2015, News Corp noted that Unruly was leveraging its "powerful data set of 2 trillion video views and sophisticated targeting compatibilities," and used "unique emotional data to help advertisers better engage global audiences." News Corp explained that Unruly's "superpower is emotional testing and targeting via Unruly EQ, which leverages over a decade of video data and almost 2.2 million viewer reactions to videos to provide deep analysis of metrics that matter, enabling us to deliver better targeting and higher campaign ROI at scale."²⁰

And clearly having access to the data is not sufficient. The skill of execution is often underestimated as is the underlying ability to provide a product that advertisers ultimately find provides an effective ROI. Established competitors have found that the increased competition both for users and advertisers has demonstrated that acquiring the biggest social media company or acquiring enormous data sets is no guarantee of success.

Moreover, recent studies show how access to data has limited diminishing returns to companies. Stanford University conducted a study to analyze whether increased accumulation of data improves the outcome of the analysis performed on such data. The Stanford Dogs

¹⁸ D. Daniel Sokol, Antitrust and Regulating Big Data, 23 George Mason L. Rev. 119 (2016), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2834611.

¹⁹ Martin Casado & Peter Lauten, *The Empty Promise of Data Moats*, Andreessen Horowitz (May 9, 2019), <https://a16z.com/2019/05/09/data-network-effects-moats/>.

²⁰ <https://newsCorp.com/2015/09/16/news-corp-to-acquire-social-video-ad-platform-unruly/>

Dataset contains images of 120 breeds of dogs from around the world.²¹ Researchers used this dataset for classifying breeds of dogs in images and calculated the mean accuracy for identification as the number of images in the dataset increased. The results showed that additional access to data provided diminishing returns to the accuracy of classification results.

Network Effects are not insurmountable

To the extent that network effects may be associated with certain businesses, such effects do not represent insurmountable barriers to entry as demonstrated by recent entrants such as Airbnb, Uber and WhatsApp as previously mentioned. For some services like social media, compared to services such as retail, there are indisputable consumer benefits that increase with the number of network participants that make a product or service more valuable to an individual.

The evaluation of network effects should always be accompanied by an analysis of the extent to which ‘single-homing’ and ‘multi-homing’ are present in a given market. In the case of the advertising market, though advertisers value the ability to access users, user demand for a platform is not substantially driven by the availability of advertisements. That is, an Internet user does not choose to use a search engine, or a news website based on the quality or quantity of ads. Users therefore do not necessarily flock to one platform for ads. Similarly, marketers can switch among many advertising platforms or exchanges due to the low fixed cost of running ads on multiple platforms. They have little incentive to stick to one platform. These incentives for both users and marketers mitigate the possibility of a feedback loop that locks users and marketers to an advertising platform.²²

Furthermore, under the pay-per-click model—which is the pricing structure that most digital advertising companies employ—running an ad on a platform with more “congestion” would yield better conversion rates but involve proportionally higher costs. As such, an advertiser may be incentivized to choose many smaller platforms over relying on a larger one.²³ This further encourages marketers to multi-home, weakening network effects on advertising platforms.

Importantly, network effects cannot be seen as a long-lasting moat — they can be negative as well as positive. Just as they bring positive outcomes to a company and its users when businesses are thriving, network effects can have the equivalent reverse effects, as competitors benefit from the same effects when businesses start to fail. Consequently, for example, if a company stops innovating, consumers will stop using the services provided by such company.

²¹Aditya Khosla, Nityananda Jayadevaprakash, Bangpeng Yao & Fei-Fei Li, Novel Dataset for Fine-Grained Image Categorization: Stanford Dogs (IEEE Conference on Comp. Vision & Pattern Recognition, 2011), <http://vision.stanford.edu/aditya86/ImageNetDogs/>.

²² D. Daniel Sokol, Antitrust and Regulating Big Data, 23 George Mason L. Rev. 119 (2016), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2834611.

²³ Id.

This then inevitably leads to a downward spiral: less users means less advertising income, which means less resources for further innovations.

In sum, neither data nor network effects give rise to insurmountable barriers to entry. And because consumers can switch easily among various digital services, today's leading innovators do not rest on their laurels. To the contrary, these companies are among the highest R&D spenders in the world.

Annex I:

We suggest the following bibliography to better understand the dynamics involved in the advertising sector:

- Anja Lambrecht, *E-Privacy Provisions and Venture Capital Investments in the EU* (2017), <https://www.ceps.eu/sites/default/files/E-Privacy%20Provisions%20and%20Venture%20Capital%20Investments%20in%20the%20EU.PDF>.
- Anja Lambrecht & Catherine Tucker, *Algorithmic Bias? A Study of Data-Based Discrimination in the Serving of Ads in Social Media Preliminary* (2016), https://www.ftc.gov/system/files/documents/public_events/966823/lambrecht_tucker_algorithmicbias_final.pdf.
- Anja Lambrecht & Catherine E. Tucker, *Can Big Data Protect a Firm from Competition?*, CPI Antitrust Chronicle 7 (Jan, 2017), <https://www.competitionpolicyinternational.com/wp-content/uploads/2017/01/CPI-Lambrecht-Tucker.pdf>.
- Anupam Chander, *The Racist Algorithm?*, 115 MICH. L. REV. 1023 (2017), <https://repository.law.umich.edu/cgi/viewcontent.cgi?article=1657&context=mlr>.
- Avi Goldfarb & Catherine Tucker, *Privacy and Innovation*, Innovation Policy and the Economy, Vol. 12 (2012), <http://www.nber.org/chapters/c12453.pdf>.
- D. Daniel Sokol, *Antitrust and Regulating Big Data*, 23 George Mason L. Rev. 119 (2016), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2834611.
- James Campbell, Avi Goldfarb, & Catherine Tucker, *Privacy Regulation and Market Structure*, 24 J. ECON. & MGMT. STRATEGY 47 (2015).
- Jordan Westendorf, *The Declining Price of Advertising: Policy Implications*, Progressive Policy Institute publications, available at <https://www.progressivepolicy.org/feature-item/the-declining-price-of-advertising-policy-implications/>
- Joshua Kroll, *Accountable Algorithms*, Media Policy Project Blog (Feb. 10, 2016), <http://blogs.lse.ac.uk/mediapolicyproject/2016/02/10/accountable-algorithms-a-provocation/>.
- Joshua Kroll, Joana Huey, Solon Barocas, et al., *Accountable Algorithms*, 165 U. PA. L. REV. 633 (2017), https://scholarship.law.upenn.edu/penn_law_review/vol165/iss3/3/.
- Joshua New & Daniel Castro, *How Policymakers Can Foster Algorithmic Accountability*, Center for Data Innovation (2018), <http://www2.datainnovation.org/2018-algorithmic-accountability.pdf>.
- Laurent Fresard et al., *Vertical Acquisitions, Integration and the Boundaries of the Firm*, Working Paper (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2242425.
- Lesley Chiou & Catherine Tucker, *Search Engines and Data Retention: Implications for Privacy and Antitrust, on Fine-Grained Visual Categorization (FGVC)*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2011.

- Lesley Chiou & Catherine Tucker, *Search Engines and Data Retention: Implications for Privacy and Antitrust*, NBER Working Papers 23815, National Bureau of Economic Research, Inc. (2017).
- Michael Salinger, *Vertical Mergers*, THE OXFORD HANDBOOK OF INTERNATIONAL ANTITRUST ECONOMICS, VOL. 1 (Roger D. Blair & D. Daniel Sokol eds. 2014).
- Mingyu Joo, Kenneth C. Wilbur, Bo Cowgill & Yi Zhu, *Television Advertising and Online Search*, 60 Mgmt. Science 1 (Jan. 2014),
<https://pubsonline.informs.org/doi/10.1287/mnsc.2013.174>
- Moritz Hardt et al., *Equality of Opportunity in Supervised Learning* (2016),
<http://papers.nips.cc/paper/6374-equality-of-opportunity-in-supervised-learning.pdf>.
- Nandini Lahiri & Sriram Narayanan, *Vertical Integration, Innovation, and Alliance Portfolio Size: Implications for Firm Performance*, 34 STRAT. MGMT. J. 1042 (2013).
- Research Report for Europe Online: An Experience Driven by Advertising Study, GFK,
https://datadrivenadvertising.eu/wp-content/uploads/2017/09/EuropeOnline_FINAL.pdf
- Research Report for The Economic Contribution of Digital Advertising in Europe, IHS MARKIT, https://datadrivenadvertising.eu/wp-content/uploads/2017/09/DigitalAdvertisingEconomicContribution_FINAL-1.pdf.
- Research Report for The Economic Value of Behavioural Targeting In Digital Advertising, IHS MARKIT, https://datadrivenadvertising.eu/wp-content/uploads/2017/09/BehaviouralTargeting_FINAL.pdf.
- Roger D. Blair & D. Daniel Sokol, *Welfare Standards in U.S. and E.U. Antitrust Enforcement*, 81 FORDHAM L. REV. 2497 (2013).
- Ryan Calo, *Artificial Intelligence Policy: A Primer and Roadmap*, 51 U.C.D. L. REV. 399 (2017),
<https://heinonline.org/HOL/LandingPage?handle=hein.journals/davlr51&div=18&id=&page=>
- Sam Ransbotham & Sabyasachi Mitra, *Target Age and the Acquisition of Innovation in High-Technology Industries*, 56 MGMT. SCI. 2076 (2010).
- Simi Kedia et al., *When Do Vertical Mergers Create Value?*, 40 J. FIN. 845 (2011).
- SMB Attitudes Towards Personalized Advertising, GFK (Dec. 2010),
[https://www.gfk.com/fileadmin/user_upload/dyna_content/GB/documents/Whitepapers/SMB Attitudes Towards Personalized Advertising December 2017.pdf](https://www.gfk.com/fileadmin/user_upload/dyna_content/GB/documents/Whitepapers/SMB_Attitudes_Towards_Personalized_Advertising_December_2017.pdf).
- Suan Athey, Emilio Calvano & Joshua S. Gans, *The Impact of Consumer Multi-homing on Advertising Markets and Media Consumption*, 64 Mgmt Science 1477 (Apr. 2018),
<https://pubsonline.informs.org/doi/10.1287/mnsc.2016.2675>.