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Power and dignity: the ends of online behavioral advertising in the European Union

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CHAPTER 2. ONLINE BEHAVIORAL ADVERTISING

This thesis evaluates the ability of the European Union (EU) legal framework to safeguard against consumer manipulation harms of online behavioral advertising (OBA). With this aim in mind, it is essential to explain what OBA is and how it leads to consumer manipulation and subsequent harms. This thesis defines OBA as the online phenomenon where consumers are shown advertisements that are personalized based on their behavioral data.⁸¹ This definition has three cumulative components: (i) the advertisement is targeted to individual consumers, (ii) targeting is based on the consumers' observed behavior, and (iii) consumer behavior is observed *and/or* the consumer is targeted online.⁸² This chapter aims to explain OBA by examining these components. With this in mind, Chapter 2 answers the first sub-question of the thesis:

SQ1: what is online behavioral advertising (OBA)?

Chapter 2 answers *SQ1* in five parts: first, it zooms in on the aforementioned three components of OBA from four different perspectives, and second, it combines these perspectives to describe a holistic picture of OBA. Section 2.1 examines OBA from the perspective of advertising efficiency and describes it as an advertising paradigm that OBA attempts to realize. Section 2.2. examines OBA as a specific configuration of advertising technologies advertisers use for their campaigns. Section 2.3 examines OBA as a market for purchasing online advertisement space, explaining the actors, the ecosystem, and the role of data. Section 2.4 examines the infrastructures that facilitate OBA, such as the programmatic auction, tracking technologies, and emerging alternative methods for advertising personalization. Section 2.5 concludes this chapter and answers *SQ1* by combining four perspectives on OBA described in sections 2.1-2.4.

⁸¹ The definition of OBA in this thesis is based on the definition provided in Sophie C. Boerman, Sanne Kruijemeier & Frederik J. Zuiderveen Borgesius, *Online Behavioral Advertising: A Literature Review and Research Agenda*, 46 J. ADVERT. 363, 364 (2017). Boerman, Kruijemeier, and Zuiderveen Borgesius define OBA as the “practice of monitoring people’s online behavior and using the collected information to show people individually targeted advertisements.” As Varnali later argued, the line between online and offline behavior is blurry. For example, this definition may fail to capture instances when advertising is personalized based on offline consumer behavior (e.g., visiting a particular offline store) that has been recorded via tracking technologies (e.g., using Wi-Fi). Kaan Varnali, *Online Behavioral Advertising: An Integrative Review*, 27 J. MARKETING COMM. 93, 106 (2021). Therefore, the definition in this thesis is slightly adapted to cover such instances.

⁸² Boerman, Kruijemeier, and Zuiderveen Borgesius identify two components: “(1) the monitoring or tracking of consumers’ online behavior and (2) use of the collected data to individually target ads.” Boerman, Kruijemeier, and Zuiderveen Borgesius, *supra* note 82, at 364. The definition of this thesis disentangles the role of the Internet in OBA in a separate component.

2.1. The OBA Paradigm

Three components of the OBA definition reveal three premises that form the OBA paradigm: (i) targeting individual consumers with advertisements is beneficial for advertisers and possibly consumers, (ii) consumers' observed behavior reveals what they react to better than voluntary disclosure (e.g., through surveys), and (iii) the Internet can be used to observe and influence consumer behavior. This section describes the historical processes that led to the emergence of these premises and their collision into a single paradigm. Section 2.1.1 explains how the emergence of cable television fragmented once concentrated mass markets and created a need for advertisers to target narrowly specified audiences. Section 2.1.2 explains the move towards the logic of behaviorism in marketing. Section 2.1.3 illustrates how the Internet catalyzed the logic of targeting and behaviorism into OBA – the most profitable paradigm in the history of advertising.⁸³

2.1.1. Targeting

The rise of advertising came with the mass production of goods in industrialized societies, which created the need for producers to inform mass populations.⁸⁴ Therefore, during almost the entire twentieth century, the primary form of advertising has been mass-market advertising, directing advertisements to the most significant number of consumers possible.⁸⁵ In this period, the legacy (mass) media facilitated mass-market advertising through newspapers and magazines, and later through radio since the 1920s and television since the 1950s.⁸⁶ However, this trend started to shift by the 1970s when the proliferation of channels on *cable* television and new technologies such as CD players and home video recorders fragmented the mass market that was no longer concentrated on a handful of broadcast channels.⁸⁷

Targeting practices in advertising were not new phenomena. Marketers have always targeted their consumers with tailored communications: newspapers and magazines have been creating specialized output tailoring their content, including advertisements to specific audiences (primarily based on class, ethnicity, and gender).⁸⁸ Also, in radio and television, the Nielsen Ranking System provided broad

⁸³ See ZUIDERVEEN BORGESIU, *supra* note 52, at 17.

⁸⁴ See JOSEPH TUROW, BREAKING UP AMERICA: ADVERTISERS AND THE NEW MEDIA WORLD 20–21 (1998). About Industrialization and capitalism: See Herbert Marcuse, *Industrialization and Capitalism*, NEW LEFT REV. 3 (1965).

⁸⁵ See TUROW, *supra* note 85, at 20–21. See also Abigail Bartholomew, *Behaviorism's Impact on Advertising: Then and Now*, 37 THESES C. JOURNALISM & MASS COMM. 1, 8 (2013).

⁸⁶ See COHEN, *supra* note 21, at 38. See TUROW, *supra* note 84, at 4.

⁸⁷ See COHEN, *supra* note 21, at 39. See TUROW, *supra* note 84, at 38.

⁸⁸ See TUROW, *supra* note 84, at 27. See also Advertising the Model T, THE HENRY FORD BLOG (Sep. 9, 2015), <https://www.thehenryford.org/explore/blog/advertising-the-model-t/> (last visited Jan 18, 2023).

demographic information about the viewers (i.e., gender and age group).⁸⁹ However, due to the deep fragmentation of the once concentrated market towards the end of the twentieth century, advertisers started looking for new audiences that they could define in finer detail.⁹⁰ As a result, targeted marketing practices such as direct and database marketing have emerged as primary logic, within which advertisers started compiling increasing amounts of consumer data.⁹¹

2.1.2. Behaviorism

In the search to define consumer audiences in newer, more granular ways, the marketing industry not only collected data through voluntary self-disclosure, such as surveys, but increasingly adopted the observational logic that underpins the branch of psychology called *behaviorism*.⁹² Historically, behaviorism understood a human experience as measurable, observable behavior that can be studied, predicted, and influenced without the subject's awareness.⁹³ Since its development as a scientific theory, behaviorism has been applied in marketing – John B. Watson, a psychologist who conceptualized the term in 1924, became the vice president of one of the largest advertising agencies in the 1930s.⁹⁴ While marketers initially used behaviorism to build brand loyalty and tailor advertising messages, behavioral strategies started to be adopted in targeting practices at the end of the twentieth century.⁹⁵

Supermarkets were pioneers in using behavioral information for their targeting campaigns.⁹⁶ A recent example of a supermarket relying on consumer behavioral data to target the consumer with a marketing communication is when *Target Inc.*, a United States (US) store, made headlines in 2012 for its data-driven targeting practices.⁹⁷ By analyzing the shopping behavior of their consumers who disclosed

⁸⁹ See TUROW, *supra* note 84, at 25.

⁹⁰ See ZUIDERVEEN BORGESIU, *supra* note 52, at 17–18. See COHEN, *supra* note 28, at 39. See also IEN ANG, *DESPERATELY SEEKING THE AUDIENCE* 27–36 (1991).

⁹¹ See TUROW, *supra* note 84, at 55–90. See ZUIDERVEEN BORGESIU, *supra* note 52, at 17–18. See Shelly Rodgers, Hugh Cannon & Jensen Moore, *Segmenting Internet Markets*, in *INTERNET ADVERTISING: THEORY AND RESEARCH* 147, 148 (David W. Schumann & Esther Thorson eds., Mahwah, NJ: Lawrence Erlbaum Associates ed. 2007).

⁹² See ZUBOFF, *supra* note 20, at 371–375.

⁹³ See Rodgers, Cannon, and Moore, *supra* note 91, at 148.

⁹⁴ See Bartholomew, *supra* note 85, 8-11.

⁹⁵ See *Id.*; See also COHEN, *supra* note 28, at 21. See also Adam Arvidsson, *On the “Pre-History of The Panoptic Sort”: Mobility in Market Research*, 1 *SURVEILLANCE SOC’Y* 4 (2003).

⁹⁶ See JOSEPH TUROW, *THE AISLES HAVE EYES: HOW RETAILERS TRACK YOUR SHOPPING, STRIP YOUR PRIVACY, AND DEFINE YOUR POWER* (2017).

⁹⁷ See Charles Duhigg, *How Companies Learn Your Secrets*, *THE NEW YORK TIMES*, Feb. 16, 2012, <https://www.nytimes.com/2012/02/19/magazine/shopping-habits.html> (last visited Jan 2, 2023). See also Kashmir Hill, *How Target Figured Out A Teen Girl Was Pregnant Before Her Father Did*, *FORBES*, Feb. 16, 2012, <https://www.forbes.com/sites/kashmirhill/2012/02/16/how-target-figured-out-a-teen-girl-was-pregnant-before-her-father-did/> (last visited Jan 2, 2023).

that they were pregnant, Target constructed a “pregnancy prediction” score.⁹⁸ When new consumers exhibited similar purchasing behavior, Target automatically predicted that they were pregnant and targeted them with related marketing communications (e.g., sending booklets about diapers to the home addresses of their consumers).⁹⁹ However, the internet, in particular platforms such as search engines, arguably provides the best venue for operationalizing such behavioral targeting on a global scale.

2.1.3. The Internet

The Internet is the global network of computer networks that connect, communicate, and exchange data via technical protocols known as the Internet Protocol Suite or TCP/IP.¹⁰⁰ The Internet became accessible to the general public in 1991, with the launch of the World Wide Web (WWW or the Web) – a tool that allowed the representation of digital content stored on computer networks (e.g., documents, text resources) into websites – a presentable form of digital content that could be accessed by anyone connected to the internet.¹⁰¹ Internet users could access websites via typing their uniquely assigned Uniform Resource Locators (URLs) in the address bar of a web browser (e.g., Mosaic or Netscape Navigator – applications created solely for accessing websites), but also by clicking *hyperlinks* – text on the website that directs the user to another website and its digital content.¹⁰²

Some innovators created websites with the sole purpose of searching for other websites. These so-called “online search engines” provided a list of hyperlinks related to the keyword that the internet user typed in the search bar, and as the number of websites proliferated, they became the primary way the internet users accessed the Web.¹⁰³ For example, Yahoo!, initially called “Jerry and David’s Guide to the World Wide Web”, became the most popular website by the year 2000.¹⁰⁴ Nevertheless, since 2000, Yahoo! started relying on the *PageRank algorithm*, an algorithm of its competitor, Google Search, that accomplished unprecedented relevance and efficiency in delivering search results.¹⁰⁵ Google

⁹⁸ See Duhigg, *supra* note 97. See ZUIDERVEEN BORGESIUS, *supra* note 52, at 44.

⁹⁹ See Duhigg, *supra* note 97.

¹⁰⁰ See Michael Aaron Dennis, *Internet: Description, History, Uses, & Facts*, BRITANNICA, <https://www.britannica.com/technology/Internet> (last visited Jan 17, 2023).

¹⁰¹ *World Wide Web*, WIKIPEDIA (2023), https://en.wikipedia.org/w/index.php?title=World_Wide_Web (last visited Jan 17, 2023).

¹⁰² *Id.*

¹⁰³ See also ZUBOFF, *supra* note 20, at 63–98.

¹⁰⁴ See James Eagle, *Animation: The Most Popular Websites by Web Traffic (1993-2022)*, VISUAL CAPITALIST (Sep. 9, 2022), <https://www.visualcapitalist.com/cp/most-popular-websites-by-web-traffic/> (last visited Jan 17, 2023).

¹⁰⁵ See for Google manifesto Sergey Brin & Lawrence Page, *The Anatomy of a Large Scale Hypertextual Web Search Engine*, 30 COMPUTER NETWORKS & ISDN SYS. 107 (1998).

Search's technological superiority stemmed from adopting behaviorist logic – it observed cues of consumers' online behavior, such as the pattern of searched terms, spelling, punctuation, dwell times, and locations that were ignored by other search engines.¹⁰⁶ It used these cues, sometimes called “data exhaust” or “digital breadcrumbs,” to turn the search engine into a recursive algorithmic system that continuously learned and improved the search results.¹⁰⁷ In other words, Google Search increasingly showed internet users what they were looking for, particularly in contrast with its competitors.

The ban on commercial use of online activities was lifted in 1994, but at that time, internet users were primarily members of a homogenous group of middle-to-upper-income college-educated men, and advertisers were slow to show interest.¹⁰⁸ However, by the 2000s, as a more significant part of human society moved online, search engines became a new venue for marketers to reach audiences that now disclosed their interests by typing keywords into the search engine.¹⁰⁹ For example, Overture, which operated GoTo.com, allowed marketers to bid for their websites to be prioritized in the search results: the highest bidder was listed first, the runner-up was listed second, and so forth.¹¹⁰ In contrast, Google Search faced bankruptcy, as its founders, committed to retaining its technological superiority and high standards of search relevance, refused to rely on advertising.¹¹¹

However, in response to the continuous pressure from investors to find a profitable business model, Google Search adopted several forms of online targeted advertising that were claimed to provide the users with an advertisement that they found relevant that could be demonstrated by increased conversion rates – the rate of the number of times consumers clicked the ads.¹¹² One configuration of advertising on Google Search was OBA that, similar to when improving search results, relied on observing consumer behavior and targeting advertisements based on “digital breadcrumbs” Google Search picked up about the consumers. OBA demonstrated the highest conversion rates compared to other configurations, becoming most

¹⁰⁶ See ZUBOFF, *supra* note 20, at 68.

¹⁰⁷ See *Id.* at 68–69.

¹⁰⁸ See Rodgers, Cannon, and Moore, *supra* note 91, at 151.

¹⁰⁹ See ZUIDERVEEN BORGESIU, *supra* note 23, at 18. See also Susie Chang BA, *Internet Segmentation: State-of-the-Art Marketing Applications*, 2 J. SEGMENTATION MARK. 19 (1998).

¹¹⁰ See Saul Hansell, *Google's Toughest Search Is for a Business Model*, THE NEW YORK TIMES, Apr. 8, 2002, <https://www.nytimes.com/2002/04/08/business/google-s-toughest-search-is-for-a-business-model.html> (last visited Jan 17, 2023).

¹¹¹ See *Id.* The founders of Google Search wrote: “We expect that advertising funded search engines will be inherently biased towards the advertisers and away from the needs of the consumers. This type of bias is very difficult to detect but could still have a significant effect on the market... we believe the issue of advertising causes enough mixed incentives that it is crucial to have a competitive search engine that is transparent and in the academic realm.” Sergey Brin and Lawrence Page, *supra* note 105, Appendix A.

¹¹² See ZUBOFF, *supra* note 34, at 71–82.

popular amongst advertisers and thus becoming Alphabet's (previously Google) primary revenue stream. Section 2.2 disambiguates OBA by delineating it from related, similar, and overlapping configurations of online advertising.

2.2. The OBA Configuration

This section examines OBA as the configuration of online advertising dashboards where advertisers choose to target consumers grouped based on the interest inferred by consumers' behavioral data.¹¹³ Online advertising configurations often overlap, making it confusing for an observer to identify the specific characteristics of OBA. With this in mind, section 2.2.1 delineates OBA from other online advertising configurations. Section 2.2.2 disambiguates OBA by explaining the terms used to describe this configuration.

2.2.1. Online Targeted Advertising

Online targeted advertising refers to an online advertising practice that delivers an advertisement tailored to a particular context or an individual consumer.¹¹⁴ Therefore, two major types of online targeted advertising are contextual and personalized advertising.¹¹⁵ Alphabet did not invent online targeted advertising, but it has provided state-of-the-art practice in all forms since 2003. Therefore, further description of online targeted advertising roughly resembles the terminology of Alphabet with regard to these practices.¹¹⁶

In contextual advertising, advertisers target consumers based on the interaction context.¹¹⁷ This may include the digital content on the publisher's web page or app that the consumer is accessing, the language content is presented in, the time of the day content is accessed, the general geographic location (e.g., country, state) of the

¹¹³ See ZUIDERVEEN BORGESIU, *supra* note 25, at 14.

¹¹⁴ EUROPEAN COMMISSION, CONSUMERS, HEALTH, AGRICULTURE AND FOOD EXECUTIVE AGENCY, CONSUMER MARKET STUDY ON ONLINE MARKET SEGMENTATION THROUGH PERSONALISED PRICING/OFFERS IN THE EUROPEAN UNION FINAL REPORT 31 (2018) [hereinafter European Commission Study Personalization]. Online targeted advertising is one of several online marketing strategies. Other online marketing strategies include, for example, social media influencer marketing. See THE REGULATION OF SOCIAL MEDIA INFLUENCERS (Catalina Goanta & Sofia Ranchordás eds., 2020). OBA, is a sub-type of online targeted advertising that most of the revenue of online platforms and shapes how these platforms are structured, and provides infrastructure for the entire Web.

¹¹⁵ Online classified advertising is another type of online advertising that is not necessarily *targeted* to a particular individual or through algorithmic analysis of the context. Instead, it resembles classic "classified advertising" found on the designated pages of newspapers listing various sponsored offers open to the readership. Craigslist is the most well-known online classified advertising websites. See *craigslist: Amsterdam*, CRAIGSLIST, <https://amsterdam.craigslist.org> (last visited Jan 11, 2023); See JESSA LINGEL, AN INTERNET FOR THE PEOPLE: THE POLITICS AND PROMISE OF CRAIGSLIST (2020), (last visited Jan 11, 2023).

¹¹⁶ See ZUBOFF, *supra* note 20, at 63–98.

¹¹⁷ See *Contextual Targeting*, GOOGLE ADS HELP, <https://support.google.com/google-ads/answer/1726458?hl=en> (last visited Jan 2, 2023).

content is accessed from, as well as the weather on that location.¹¹⁸ This contextual information allows advertisers to present ads in the correct language, in the correct market, with the awareness of the elements of the day, and achieve relevance by analyzing the content consumers access instead of analyzing information about the consumers themselves.¹¹⁹ For example, suppose a consumer residing in the Netherlands is reading a blog during a rainy afternoon in English about the benefits of running. In that case, contextual advertising may expose them to advertisements in the English language for waterproof running shoes that can be bought and delivered in the Netherlands.

In contrast to contextual advertising, personalized advertising targets individual consumers based on consumer identity or using the data *about* consumers themselves.¹²⁰ Personalized advertising can be based on data that consumers provide voluntarily. Segmented advertising is a stipulatory term used in the policy documents of the EU institutions to describe personalized advertising that relies on *broad demographic* information that the consumers voluntarily disclose by, for example, signing up for digital services or content.¹²¹ Such information usually includes gender, age, country of residence, and, in some instances, the parental status of the consumer.¹²² For example, to promote its business, an exclusively women’s fitness studio located in Amsterdam may choose to target women in the age group of 18–65 who live in Amsterdam.

Personalized advertising can also rely on more *detailed* demographic information, such as the consumer’s education (e.g., high-school graduate), finances (e.g., household income top 10%), relationship status (e.g., married), employment (e.g., tech industry), or other socio-demographic categories.¹²³ Advertisers can build such a consumer *profile* based on the data voluntarily disclosed by the consumer (i.e., “explicit profile”) or based on the data about consumer behavior that they *observed* (“predictive profile”).¹²⁴ Developing *predictive profiles* by algorithmically

¹¹⁸ See Kaifu Zhang & Zsolt Katona, *Contextual Advertising*, 31 *MARKETING SCI.* 980 (2012).

¹¹⁹ Online contextual advertising, does not necessarily rely on personal data – information about the identified or identifiable individual as defined by the General Data Protection Regulation. Nevertheless, such data may be used for “frequency capping”, a practice that establishes the maximum number of times a single user sees the advertisement. See European Parliament Study Consent in Targeted & Behavioral Advertising, *supra* note 36, at 26.

¹²⁰ See *Personalized Advertising*, GOOGLE ADVERTISING POLICIES HELP, <https://support.google.com/adspolicy/answer/143465?hl=en> (last visited Jan 2, 2023).

¹²¹ See European Parliament Study Online Advertising & Consumer Choice, *supra* note 36, at 19. See European Parliament Study Consent in Targeted & Behavioral Advertising, *supra* note 36, at 26.

¹²² See *About Demographic Targeting*, GOOGLE ADS HELP, <https://support.google.com/google-ads/answer/2580383> (last visited Jan 2, 2023).

¹²³ See *Id.* See *About Detailed Targeting*, META BUSINESS HELP CENTER, <https://www.facebook.com/business/help/182371508761821> (last visited Jan 2, 2023).

¹²⁴ ARTICLE 29 DATA PROTECTION WORKING PARTY, *Opinion 2/2010 on Online Behavioral Advertising* 7 (2010).

inferring attributes based on the observed online behavioral data about the consumer is commonly called “profiling”.¹²⁵ Advertising configuration that relies on such profiling is called OBA.¹²⁶ Observed online behavioral data about the consumer may include social media data (e.g., posts and likes), search data (e.g., history), web browsing data (e.g., media consumption data), mouse cursor movement, keyboard strokes, and location data.¹²⁷

2.2.2. Profiling: Behavioral Personalization

In OBA, consumers can be profiled beyond demographic traits and may include inferring *psychographic* traits such as affinities, interests, values, and lifestyles.¹²⁸ For example, a consumer can be inferred to be a “surf enthusiast”, a “sci-fi fan”, a “dog lover”, someone who “is about to have a wedding anniversary,” or who “recently moved to Hawaii”.¹²⁹ In OBA, inferences about the consumers’ demographic and psychographic traits are made algorithmically, typically via data mining or artificial intelligence (AI), including machine learning (ML) techniques that recognize patterns and correlations in otherwise raw data.¹³⁰ Further, inferences can be drawn through consumers’ similarity with other consumers – a feat called “lookalike audience” or “similar audience”.¹³¹ The latter practice implies using (sometimes voluntarily disclosed) data from a group of people to predict and infer something about a consumer not explicitly part of that group, as described in Target’s pregnancy prediction case explained in section 2.1.2.¹³²

¹²⁵ See European Commission Study Personalization, *supra* note 114, at 49. See European Parliament Study Online Advertising & Consumer Choice, *supra* note 36, at 19. The General Data Protection Regulation defines “profiling” as “any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to a natural person, in particular to analyze or predict aspects concerning that natural person’s performance at work, economic situation, health, personal preferences, interests, reliability, behavior, location or movements.” General Data Protection Regulation, *supra* note 45, at 4(4). See also Mireille Hildebrandt, *Defining Profiling: A New Type of Knowledge?*, in PROFILING THE EUROPEAN CITIZEN: CROSS-DISCIPLINARY PERSPECTIVES 17 (Mireille Hildebrandt & Serge Gutwirth eds., 2008).

¹²⁶ See ZUIDERVEEN BORGESIU, *supra* note 52, at 15.

¹²⁷ See *Id.* at 35–38.

¹²⁸ See European Parliament Study Online Advertising & Consumer Choice, *supra* note 36 at 19. See About Audience Targeting, *supra* note 25.

¹²⁹ See About Demographic Targeting, *supra* note 122.

¹³⁰ See generally about data mining: BART CUSTERS, THE POWER OF KNOWLEDGE: ETHICAL, LEGAL AND TECHNOLOGICAL ASPECTS OF DATA MINING AND GROUP PROFILING IN EPIDEMIOLOGY (2004). See generally about machine learning: GALLI, *supra* note 41.

¹³¹ See About Lookalike Audiences, META BUSINESS HELP CENTER, <https://www.facebook.com/business/help/164749007013531?id=401668390442328> (last visited Jan 3, 2023). See About Similar Segments for Search, GOOGLE ADS HELP, <https://support.google.com/google-ads/answer/7151628> (last visited Jan 3, 2023).

¹³² See ZUIDERVEEN BORGESIU, *supra* note 52, at 44.

Profiling can also be used for personalizing any digital content more broadly.¹³³ For example, using behavioral data for personalizing search results by changing their order is often called “personalized ranking” – a practice that almost all websites engage in that allows search (e.g., search engines and online marketplaces).¹³⁴ For example, a consumer searching for “boxing gloves” may be presented with offers from different suppliers, where prominence is given to suppliers from which the consumer has already bought other products. Note that algorithms for personalizing digital content are often called “recommender systems.”

In addition, some websites that use recommender systems for personalizing search results allow advertisers to pay prominence to their products (i.e., “paid ranking”).¹³⁵ This thesis addresses paid ranking as part of OBA to the extent to which behavioral personalization considers consumers’ predictive profiles.¹³⁶ In addition, profiling can be used to personalize prices. Online personalized pricing (alternatively “online price discrimination”) refers to offering different online prices for identical products or services to different consumers.¹³⁷ In one example, Amazon was found to vary prices for video games and Kindle e-books based on consumers’ IP addresses.¹³⁸ In rare cases, online personalized pricing can also be OBA, when an advertiser explicitly sponsors differentiation, for example, for placing an advertisement that offers a discount to a consumer based on their previous buying history.¹³⁹

Profiling, or behavioral personalization, can also be used to optimize content other than advertising and search results. Such behavioral personalization of content is often framed as the core practice of digital service and content providers. For example, Netflix claims to provide “personalized digital content service” – referring to its movie recommendation system, and Facebook defines its primary service as

¹³³ See *Id.*, at 49.

¹³⁴ See European Commission Study Personalization, *supra* note 114 at 41–43. The personalized ranking is sometimes conflated with “price-steering”, that refers to personalization to influence consumers’ willingness to pay the price by placing “more or less expensive products at the top of the list.” See Aniko Hannak et al., *Measuring Price Discrimination and Steering on E-Commerce Web Sites*, in PROCEEDINGS 2014 INTERNET MEASUREMENT CONF. 305, 307 (2014).

¹³⁵ See *Commerce Ranking Disclosure*, FACEBOOK, https://www.facebook.com/legal/commerce_ranking (last visited Jan 3, 2023).

¹³⁶ Overture’s (GoTo.com) paid search described in section 2.1.3 was not online behavioral advertising because it presented search results based on keywords and volume of bids, not behavioral profiles of consumers.

¹³⁷ See Frederik J. Zuiderveen Borgesius & Joost Poort, *Online Price Discrimination and EU Data Privacy Law*, 40 J. CONSUMER POL’Y 347, 348 (2017). See Sears, *supra* note 80, at 3.

¹³⁸ See Sears, *supra* note 80, at 3.

¹³⁹ See European Parliament Study Online Advertising & Consumer Choice, *supra* note 36, at 63.

the provision of “personalized experience” – referring to its News Feed.¹⁴⁰ While behavioral personalization of content is not the same as OBA, the latter often involves the former. Sometimes, they are bundled together to justify data collection for advertising personalization.¹⁴¹ Also, content personalization can indirectly increase online behavioral advertising revenue by maximizing user engagement.¹⁴² These practices are further discussed in detail in section 4.2 about manipulative design.

Another form of behaviorally personalized advertising is “re-targeting,” which relies exclusively on consumers’ observed shopping behavior and shows consumers ads for the products and services interest they revealed by, for example, adding them to the shopping cart of the online marketplace.¹⁴³ Re-targeting is particularly noticeable for consumers, as they experience being followed by advertisements across the Internet.¹⁴⁴ For example, a consumer who was considering buying a sports jersey on the website of their favorite football club, but stopped at the checkout, can be offered to buy the jersey when he has moved on from the club’s website and is now reading an online newspaper, or checking their feed on social media. Re-targeting is sometimes dubbed as “creepy marketing” because of the following nature of the advertisement.¹⁴⁵

Finally, online behavioral advertising is rarely applied in isolation. Instead, advertising campaigns often combine segmented, contextual, and behavioral targeting features.¹⁴⁶ Therefore, this thesis refers to OBA as all online advertising practices that rely on online behavioral data for personalization.

2.3. The OBA Markets

This section examines OBA as a phenomenon that gives rise to new digital markets. With this in mind, section 2.3.1 explains who the buyers and sellers of OBA are. Section 2.3.2 zooms in on two different forms of OBA intermediation, and section 2.3.3 explains the role of data and platform power in such markets of OBA intermediation.

¹⁴⁰ See *Netflix Terms of Use*, NETFLIX, <https://help.netflix.com/legal/termsfuse> (last visited Jan 12, 2023). See *Terms of Service*, *supra* note 19.

¹⁴¹ See Zard and Sears, *supra* note 1 at 812–813.

¹⁴² See ZUIDERVEEN BORGESIU, *supra* note 25 at 49.

¹⁴³ See European Parliament Study Online Advertising & Consumer Choice, *supra* note 36, at 19.

¹⁴⁴ See *Id.*, at 19–20. ZUIDERVEEN BORGESIU, *supra* note 52 at 48.

¹⁴⁵ See Robert Moore et al., *Creepy Marketing: Three Dimensions of Perceived Excessive Online Privacy Violation*, 25 *MARKETING MGMT. J.* 42 (2015).

¹⁴⁶ See European Parliament Study Online Advertising & Consumer Choice, *supra* note 36, at 20.

2.3.1. Publishers and Advertisers

In this thesis, “publishers” are referred to as the providers of digital services that publish advertising on their online interface (GLOSSARY). Publishers monetize consumer visits by selling online advertising space called “inventory” to advertisers.¹⁴⁷ Although advertisers include large corporations responsible for most of the online advertisement spending (for example, in 2021, HBO Max spent \$635 million, Disney Plus - \$403 million, and Walmart – \$331 million), it also includes much smaller companies or individuals.¹⁴⁸

Similarly, publishers can be individuals that, for example, run personal blogs, but also large corporations that provide news media (e.g., The New York Times, Le Monde), online stores (e.g., Nike, Zara), online games (e.g., Candy Crush Saga, Pokémon Go), or digital platforms (e.g., Google Search, Facebook, Amazon Store, Apple App Store, Uber).¹⁴⁹ Platform providers are the most prominent publishers, as they generate the most of the traffic online. Taking the United Kingdom (UK) as a comparative example, in 2020, internet users spent fifty percent of their time online using the top ten platform services and thirty-seven percent using the platform services of two companies – Alphabet and Meta.¹⁵⁰

The platform services of Alphabet (e.g., Google Search, Google Maps, YouTube) and Meta (e.g., Facebook, Instagram, WhatsApp) are the most prominent advertising publishers because they reach a massive amount of online consumers who find their services of search and social networking almost essential for accessing social, cultural and commercial connectivity.¹⁵¹

To illustrate, Google Search managed ninety percent of all searches in Europe, and Meta’s platform services handled eighty percent of all social network traffic worldwide.¹⁵² Also, in 2020, Alphabet reached ninety percent of all online consumers in the UK, and Meta reached seventy-five percent.¹⁵³ As consumers spend most of their time online using their services, these platforms act as “gates”

¹⁴⁷ See *Glossary of Terminology*, *supra* note 27.

¹⁴⁸ See *Largest Global Advertisers 2021*, STATISTA, <https://www.statista.com/statistics/286448/largest-global-advertisers/> (last visited Jan 12, 2023). See also CMA (UK) Study Online Platforms & Digital Advertising Final Report, *supra* note 33, at 61.

¹⁴⁹ European Parliament Study Consent in Targeted & Behavioral Advertising, *supra* note 36, 26.

¹⁵⁰ See COMPETITION & MARKETS AUTHORITY, *Online Platforms and Digital Advertising: Market Study Appendix C: Market Outcomes* 11 (2020). Four out of five most visited websites worldwide belong to Alphabet and Meta in 2022. See *Most Visited Websites - Top Websites Ranking for December 2022*, SIMILARWEB, <https://www.similarweb.com/top-websites/> (last visited Jan 12, 2023).

¹⁵¹ See COHEN, *supra* note 28, at 44.

¹⁵² See European Parliament Study Consent in Targeted & Behavioral Advertising, *supra* note 36, at 19.

¹⁵³ CMA (UK) Study Online Platforms & Digital Advertising Appendix C, *supra* note 150 at 11.

through which business users can access consumers; therefore, providers of these platforms are sometimes called “gatekeepers”.¹⁵⁴

In exchange for giving the consumers access to their now essential services, gatekeepers assume access to the data about online consumer behavior (i.e., “access-data bargain”), and by applying algorithmic techniques to these data, they render consumers legible.¹⁵⁵ In other words, by analyzing online behavioral data about the individual consumer and consumers in the aggregate, gatekeepers can define narrow consumer segments, profile individual consumers based on their predicted behavior (inferred from their past online behavior), and allocate them into pre-defined or custom segments (e.g., “surf-enthusiast”, “recently divorced”).¹⁵⁶ These capabilities equip gatekeepers to be at the center of OBA intermediation for other publishers and advertisers.

2.3.2. Walled Gardens and AdTech

Non-platform publishers, such as providers of some online newspapers, stores, or games (GLOSSARY), lack capabilities of intermediation and legibility that platforms, especially gatekeepers, wield and cannot build extensive predictive profiles about the consumers. In response to the demand of non-platform publishers to mimic OBA practices, the platform providers have expanded their OBA practices beyond their services by creating advertising networks (“ad networks”), for example, Alphabet’s *Google Display Network* (GDN) and Meta’s Audience Network (AN).¹⁵⁷

These ad networks provide publishers with outsourced sales of advertising space and provide advertisers with aggregated advertising spaces from numerous publishers (GLOSSARY). Ad networks also provide unique targeting capabilities and ad optimization tools. By creating ad networks, platform service providers

¹⁵⁴ See Zittrain, *supra* note 14. See also GIOVANNI DE GREGORIO, DIGITAL CONSTITUTIONALISM IN EUROPE: REFRAMING RIGHTS AND POWERS IN THE ALGORITHMIC SOCIETY 17 (2022). “Very large online platform (VLOP)” has a specific legal meaning in Digital Services Act and, therefore, is addressed in more detail in 6.1.4.2 See Digital Services Act, *supra* note 2. Likewise, “gatekeeper” has a specific legal meaning in Digital Markets Act, and is, therefore, addressed in more detail in 6.1.4.2. See Digital Markets Act, *supra* note 14. On September 6, the European Commission designated six gatekeepers: Alphabet, Amazon, Apple, ByteDance, Meta, Microsoft for twenty-two platforms they provide. European Commission Press Release IP/23/4328, The Commission, Digital Markets Act: Commission designates six gatekeepers (Sep. 6, 2023), https://ec.europa.eu/commission/presscorner/detail/en/IP_23_4328 (last visited Oct 10, 2023).

¹⁵⁵ See COHEN, *supra* note 28 at 37–47.

¹⁵⁶ See *Id.*

¹⁵⁷ See *Glossary of Terminology*, *supra* note 27. Platforms provide self-service interfaces (e.g., Google Ads, Facebook’s Ads Manager) where advertisers select their goals, targeting criteria, and bid amounts or budget. See *Estimate Your Results with Bid, Budget and Target Simulators*, GOOGLE ADS HELP, https://support.google.com/google-ads/answer/2470105?hl=en&ref_topic=3122864 (last visited Jan 4, 2023).

intermediate between advertisers and other publishers that would not be able to provide similar OBA optimization independently.¹⁵⁸

For example, a large advertiser, such as Nike, wants to advertise its new waterproof running shoes to reach the largest number of online consumers who are enthusiastic about running and live in rainy countries. *Google Ads* uses extensive behavioral data about the consumers to profile them and follow them on the websites of all publishers that joined *GDN*, for example, the online newspaper *The Economist*. By using *Google Ads*, including *GDN*, Nike can target particular consumers on Alphabet’s platform services, such as Google Search, YouTube, but also every other publisher who joined *GDN*.¹⁵⁹ Moreover, by joining *GDN*, *the Economist* can access predictive profiles (e.g., identify visiting consumers as “running enthusiasts”) that they would not be able to generate without joining.

Such ad networks are often called “walled gardens”—closed ecosystems in which platforms provide complete end-to-end intermediation, including technical solutions for advertisers and other publishers.¹⁶⁰ However, in response to the impetus of many publishers and advertisers to escape the complete dependence on platform providers for participating in OBA, new and smaller ad intermediaries have emerged that take on particular functions in the “open exchange” that allow advertisers and publishers to reach consumers over the entire Web.¹⁶¹ Due to the highly technical nature of open exchange advertising, the intermediaries involved, infrastructures, and sometimes the entire open exchange market are called “AdTech”(GLOSSARY).¹⁶²

In AdTech, Demand Side Platforms (DSPs) provide advertisers with a one-stop platform for buying advertising spaces or inventories from many different sources (usually every possible source online).¹⁶³ For example, Nike can use the services of MediaMath (the first DSP launched in 2007) to optimize its advertising expenditure by minimizing waste and placing an advertisement to the consumers for whom the advertisement is maximally relevant.¹⁶⁴ MediaMath aggregates the demand from all its advertising partners and buys advertising spaces in the open exchange according to these demands. In a simplified example, this can be that its two partners, Nike and Adidas, look for inventories (advertising spaces) in the entire internet that enable them to show an advertisement to their preferred audiences. As Nike indicated to

¹⁵⁸ See ZUBOFF, *supra* note 20 at 93–97.

¹⁵⁹ *Google AdSense* includes other websites and apps partnered with Alphabet for online advertising.

¹⁶⁰ CMA (UK) Study Online Platforms & Digital Advertising Final Report, *supra* note 33, at 155.

¹⁶¹ See *Id.* at 263–265.

¹⁶² See e.g., European Commission Press Release IP/23/3207, The Commission, *supra* note 47.

¹⁶³ See *Glossary of Terminology*, *supra* note 27.

¹⁶⁴ See *MediaMath - Future-Proofed DSP*, MEDIAMATH, <https://www.mediamath.com/> (last visited Jan 18, 2023).

MediaMath that it favors consumers who are “running enthusiasts” that live in rainy countries, it will buy an inventory shown to a consumer that closely resembles Nike’s preferred audience as much as possible. It separately meets Adidas’s demands. As it has detailed insights into what each advertiser is looking for, MediaMath can automate the process to maximize efficiency for all its clients. The upside of using DSPs instead of an end-to-end ad network is that, in looking for advertising spaces, DSP can consider many ad networks that participate in the open exchange, including gatekeepers’ walled gardens and other publishers who do not participate outside of these gardens. The downside is that competition for ad spaces can be more demanding in the open exchange, resulting in difficulty getting the best audiences or higher costs.

Supply-side platforms (SSPs) aggregate publishers’ inventories and sell them in the open exchange.¹⁶⁵ So, for example, if the New York Times (NYT) wants to monetize its online readership, enhance the user experience by providing relevant advertising, and maximize advertising profit, it can use the services of Xandr (one of the SSPs), which aggregates (or packages) inventories of NYT with the inventories of its other clients.¹⁶⁶ When Xandr identifies a particular demand for running enthusiasts who live in the rainy country and that such a consumer visits the NYT, Xander sells the advertising space to the DSP of Nike, which was looking for such a consumer. The exchange of information about the demands and the supply of the available inventory happens on the advertising exchanges (“ad exchange”), which also run the real-time auction process through which inventories are bought and sold.¹⁶⁷ The entire process occurs programmatically (fully automated) and happens almost in the same instance as a consumer visiting a particular website (see the overview of this programmatic process in section 2.4).¹⁶⁸

Many publishers do not have access to consumer behavioral data that is essential to meet the demands of successful behavioral personalization, and many advertisers may not know various new audiences they can reach. Therefore, data management platforms (DMPs) have emerged to support the demand side and supply side by enriching them with data and enabling them to define and target more narrowed-down consumer audiences.¹⁶⁹ Lastly, advertising servers (“ad servers”) provide services to advertisers and publishers for them to track, manage, and measure advertising campaigns.¹⁷⁰ Advertisers’ ad servers offer a centralized tool for managing their campaigns, including uploading advertising designs (i.e.,

¹⁶⁵ See *Glossary of Terminology*, *supra* note 27.

¹⁶⁶ See *Publisher Platforms*, XANDR, <https://www.xandr.com/solutions/monetize/> (last visited Jan 18, 2023).

¹⁶⁷ See *Glossary of Terminology*, *supra* note 27.

¹⁶⁸ See *Id.*

¹⁶⁹ CMA (UK) Study Online Platforms & Digital Advertising Final Report, *supra* note 33 at 125.

¹⁷⁰ See *Glossary of Terminology*, *supra* note 27.

creative), setting targeting criteria, or measuring performance goals across various DSPs.¹⁷¹ Similarly, publishers' ad servers provide a centralized tool for publishers to optimize monetization from targeted advertising by, for example, managing all of their inventory (websites, mobile apps, videos, games), placing trackers, getting detailed reports, and connecting to multiple SSPs or ad networks.¹⁷²

2.3.3. Markets and Power

Because of the existence of myriads of players within AdTech or the OBA open exchange, its technological and structural complexity has attracted much attention from academia.¹⁷³ Moreover, the industry continuously emphasizes the value that OBA creates for these AdTech participants, placing them at the centre of the discussions around OBA.¹⁷⁴ Nevertheless, only a small piece of OBA revenue is generated in the open exchange. Most of the online advertising revenue is channelled by the most prominent platforms. To illustrate this, in 2021, more than 80% of global online advertising revenue went to platform providers and more than 60% to platforms operated only by Alphabet and Meta.¹⁷⁵ In 2022, more than 50% of online advertising revenue went to Alphabet (\$168.44 billion) and Meta (\$112.68 billion).¹⁷⁶

The competition authorities often differentiate between several online advertising markets, depending on the advertising channels, such as *search* and *display* advertising. Search advertising consists of delivering search ads tailored to the consumer, typically based on search keywords (contextual), but sometimes also based on consumer behavior, qualifying it as a form of OBA in those cases.¹⁷⁷

¹⁷¹ See *Introducing Campaign Manager 360*, CAMPAIGN MANAGER 360 HELP, https://support.google.com/campaignmanager/answer/10157783?hl=en&ref_topic=2758513 (last visited Jan 5, 2023).

¹⁷² See *Advertising with Google Ad Manager*, GOOGLE AD MANAGER HELP, <https://support.google.com/admanager/answer/6022000?hl=en> (last visited Jan 5, 2023).

¹⁷³ See Varnali, *supra* note 81.

¹⁷⁴ *The Value of Digital Advertising*, IAB EUROPE, <https://iabeuropa.eu/the-value-of-digital-advertising/> (last visited Jan 16, 2023).

¹⁷⁵ Alphabet and Meta are often referred to as “duopoly” (or “quasi-duopoly”) in online advertising. See European Parliament Study Online Advertising & Consumer Choice, *supra* note 36 at 39. See European Commission Study Personalization, *supra* note 114, at 41–42. However, Amazon has been rising as an advertising intermediary, and, therefore, triggering new references to “triopoly”. See Google, Facebook, and Amazon: From Duopoly To Triopoly of Advertising, FORBES, Sep. 4, 2019, <https://www.forbes.com/sites/forrester/2019/09/04/google-facebook-and-amazon-from-duopoly-to-triopoly-of-advertising/> (last visited Jan 4, 2023). In the UK, platforms of Google and Meta received 80% of online advertising revenue in 2019. See CMA (UK) Study Online Platforms & Digital Advertising Final Report, *supra* note 33, at 10.

¹⁷⁶ Ronan Shields, *Here Are the 2022 Global Media Rankings by Ad Spend: Google, Facebook Remain Dominant -- Alibaba, ByteDance in the Mix*, DIGIDAY (Dec. 13, 2022), <https://digiday.com/media/the-rundown-here-are-the-2022-global-media-rankings-by-ad-spend-google-facebook-remain-dominant-alibaba-bytedance-in-the-mix/> (last visited Jan 12, 2023).

¹⁷⁷ See European Commission Study Personalization, *supra* note 36, at 16.

Alphabet is by far the single dominant actor in search advertising in the EU.¹⁷⁸ Display advertising consists of delivering banner or video ads (e.g., before the video begins) typically based on consumer behavior, qualifying it often as OBA. The market studies often single out the social media advertising market, as the largest share of display advertising happens on social media platforms (e.g., Facebook, Instagram, and YouTube).¹⁷⁹ Meta dominates the social media advertising market. The rest of the display advertising market, sometimes called the “open display” market, is where all other (non-search, non-social media) publishers, including smaller platforms, compete to sell advertising space. In the UK, the open display market amounts to 15% of total online advertising revenue.¹⁸⁰ In 2019, in Spain, Meta generated more display advertising revenue than all other publishers combined.¹⁸¹ Even in the open display market, platforms wield a significant power. This market is intermediated by the walled gardens of large platforms, such as Alphabet and Meta, as well as AdTech.

Within AdTech, Alphabet provides the largest advertising intermediaries in all functions.¹⁸² Google Marketing Platform combines the most extensive DSP (Display and Video 360) and the most prominent ad server for advertisers (Campaign Manager 360).¹⁸³ Google Ad Manager provides the largest SSP (DoubleClick for Publishers) and the most prominent ad server for publishers.¹⁸⁴ Finally, Google Authorized Buyers or Google AdX is the largest ad exchange.¹⁸⁵ While these intermediaries provide services for publishers and advertisers, they are often found to be self-serving for Alphabet.¹⁸⁶ In other words, AdTech can be seen as another walled garden of Alphabet.

The OBA industry, led by Alphabet and Meta, claims that behavioral personalization is the most efficient configuration (in contrast to contextual or segmented advertising) that creates value for publishers, advertisers, and consumers alike.¹⁸⁷ These claims point towards a higher “click-through rate” or CTR, which

¹⁷⁸ Alphabet held 70% of the search advertising market in France, and 90% in Spain and the UK. *See Id.* at 21.

¹⁷⁹ *See Id.* at 16.

¹⁸⁰ *See* CMA (UK) Study Online Platforms & Digital Advertising Final Report, *supra* note 33, at 6. *See* European Parliament Study Online Advertising & Consumer Choice, *supra* note 36, at 38–39.

¹⁸¹ European Commission Study Personalization, *supra* note 36, at 16.

¹⁸² *See* COMPETITION & MARKETS AUTHORITY, *Online Platforms and Digital Advertising: Market Study Appendix M: Intermediation in Open Display Advertising* (2020).

¹⁸³ *See Id.* at 71.

¹⁸⁴ *See Id.* at 12.

¹⁸⁵ CMA (UK) Study Online Platforms & Digital Advertising Final Report, *supra* note 33, at 12.

¹⁸⁶ *See* European Commission Press Release IP/23/3207, The Commission, *supra* note 47.

¹⁸⁷ Such claims suggest that online behavioral advertising, optimizes advertising expenditure for advertisers and publishers and, on the other hand, provides personalized (and relevant) ads for consumers, as well as funding structure for the entire internet, where consumers can access digital

measures the percentage of consumer action, such as a consumer clicking the ad when exposed to a particular advertisement.¹⁸⁸ For example, one such industry-funded study estimated that the CTR of behavioral personalization is 5 to 10 times higher than other forms of targeting in online advertising.¹⁸⁹ Nevertheless, some evidence shows the contrary.¹⁹⁰ For example, the New York Times, which has cut off OBA open exchange to rely on contextual advertising instead, declared that its revenues have significantly grown.¹⁹¹

These doubts also come with the claim that gatekeepers are the only beneficiaries of OBA markets, as this practice maximizes their profits at the expense of all other participants.¹⁹² For an illustration of platforms' profitability, the UK's Competition and Market Authority has found that Alphabet and Meta had been generating excess profit for their investors (Alphabet returned 40% of capital and Meta 50% to their investors, instead of the expected 8% that would be a fair mark).¹⁹³ In contrast to such an increase in advertising profits for the gatekeepers, the revenue of other players in the industry, publishers, advertisers, and other intermediaries have not significantly changed. Studies attribute this to the gatekeepers' control of internet access and corresponding data that OBA relies.¹⁹⁴

2.4. The OBA Infrastructures

This section describes the infrastructures that facilitate OBA and support the monetization of the Web. Section 2.4.1 describes a programmatic auction process that enables the selection of an advertisement among millions of competitors in milliseconds, section 2.4.2 describes cookies and other tracking technologies that have been used for behavioral personalization, and section 2.4.3 describes alternative models that are emerging due to obvious illegality of historical tracking methods.

content and services they value without monetary payment. *The Value of Digital Advertising*, *supra* note 174. Varnali, *supra* note 81, at 94.

¹⁸⁸See *Clickthrough Rate (CTR): Definition*, GOOGLE ADS HELP, https://support.google.com/google-ads/answer/2615875?hl=en&ref_topic=24937 (last visited Jan 4, 2023).

¹⁸⁹ *The Value of Digital Advertising*, *supra* note 174.

¹⁹⁰ European Parliament Study Online Advertising & Consumer Choice, *supra* note 36, at 19–20.

¹⁹¹ See Natasha Lomas, *The Case Against Behavioral Advertising Is Stacking Up*, TECHCRUNCH (Jan. 20, 2019), <https://techcrunch.com/2019/01/20/dont-be-creepy/> (last visited Jan 18, 2023). See Jessica Davies, *After GDPR, The New York Times Cut off Ad Exchanges in Europe -- and Kept Growing Ad Revenue*, DIGIDAY (Jan. 16, 2019), <https://digiday.com/media/gumgumtest-new-york-times-gdpr-cut-off-ad-exchanges-europe-ad-revenue/> (last visited Jan 18, 2023).

¹⁹² See Lomas, *supra* note 191.

¹⁹³ See CMA (UK) Study Online Platforms & Digital Advertising Final Report, *supra* note 33, 8.

¹⁹⁴ European Commission Study Recent Digital Advertising Developments, *supra* note 36, at 16.

2.4.1. Real-Time Bidding (RTB)

In OBA, advertising placements are determined programmatically, that is, by algorithmic systems instead of human-mediated ways.¹⁹⁵ In this programmatic process, advertisers bid on the Real-Time Bidding (RTB) auction to compete with other advertisers to target an ad to a specific consumer online.¹⁹⁶ In the OBA open exchange or AdTech, the RTB auction is housed by the ad exchanges, where SSPs sell the advertising inventory of their publishers and DSPs place bids for their advertisers.¹⁹⁷ The consumer visiting the publisher’s website initiates the programmatic process. Using the trackers placed on the website (section 2.4.2), the publisher’s SSP (or an ad server in case of multiple SSPs) generates an advertisement request (“bid request”) that contains a broad array of information about the consumer seeing the ad inventory.¹⁹⁸

Further, bid requests are passed to ad exchanges and to the DSPs that evaluate advertising opportunities based on their campaign objectives and respond with their bids, the amount of money the advertiser is willing to pay per click.¹⁹⁹ The publishers (via SSP or an ad server) rank the offers based on the price (and other priorities) and decide which advertisement will be served on the webpage (Figure 2:1).²⁰⁰

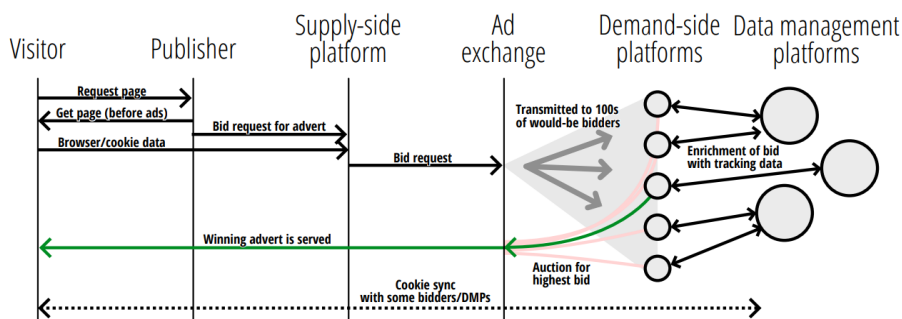


Figure 2:1. Real Time Bidding (RTB) Process (by Veale and Zuiderveen Borgesius)²⁰¹

¹⁹⁵ See Veale and Zuiderveen Borgesius, *supra* note 31 at 231.

¹⁹⁶ *Id.*

¹⁹⁷ European Parliament Study Online Advertising & Consumer Choice, *supra* note 36, at 25.

¹⁹⁸ See *Authorized Buyers Real-time Bidding Proto*, GOOGLE DEVELOPERS, <https://developers.google.com/authorized-buyers/rtb/realtime-bidding-guide> (last visited Jan 5, 2023). See *OpenRTB Integration*, GOOGLE DEVELOPERS, <https://developers.google.com/authorized-buyers/rtb/openrtb-guide> (last visited Jan 5, 2023).

¹⁹⁹ In most cases, advertisers pay per action (“cost-per-action” or CPA), for example, per click on the advertisement (“cost-per-click” or CPC). See *Estimate Your Results with Bid, Budget and Target Simulators*, *supra* note 157. See CMA (UK) Study Online Platforms & Digital Advertising Final Report, *supra* note 33, at 265.

²⁰⁰ CMA (UK) Study Online Platforms & Digital Advertising Final Report, *supra* note 33 at 265.

²⁰¹ Veale and Zuiderveen Borgesius, *supra* note 31, at 232.

Traditionally, RTB relied on a waterfall auction, in which ad exchanges and SSPs would rank their demand partners sequentially in hierarchical levels (if DSP#1 makes a bid, it gets the inventory; if not, a new auction is triggered for DSP#2, and so forth).²⁰² This enabled large players, such as Alphabet, to prefer their own ad intermediaries that were vertically integrated into the AdTech, and bids would be passed to other DSPs (who may have paid higher prices) only if Alphabet was not interested or did not meet the publisher's requirements.²⁰³ In response to this, the industry developed the *header bidding* protocol that allows queries of the multiple ad exchanges, DSPs, and advertisers simultaneously, and because it allows publishers more freedom to choose whom they sell the advertising space to (prices for which also increased), became the prominent protocol.²⁰⁴

The content of the bid requests is determined by the specifications of *Authorized Buyers* maintained by Alphabet or the *OpenRTB/AdCom* protocol maintained by the Interactive Advertising Bureau (IAB), a membership organization of advertising firms.²⁰⁵ It usually contains information about the consumer, such as age, gender, geographic location (e.g., postal code, longitude, and latitude), metadata about if the consent is provided, or interests, as well as the information about the device that the consumer is using.²⁰⁶ Although the bid requests with some or all of this information give DSPs the possibility to target the consumers in granular ways, the economic incentives of RTB auction mean that DSPs with more specific knowledge about the individual consumers will win the desirable viewers.²⁰⁷ With this in mind, DSPs employ DMPs that help them identify the consumer and enrich the DSP with data about the consumer from other sources (e.g., its database and data brokers).²⁰⁸ A DSP with the most knowledge, wins the auction and links the further data to the consumer for future profiling.

The centrality of the consumer data in the RTB process comes from the advertising paradigm of OBA, which works on the premise that targeting based on consumers' behavioral profiles ensures relevance. With this in mind, the advertisers participating in RTB have an economic incentive to ensure that they bid and compete only in cases where the winning bid maximizes the chance of the consumers clicking the advertisement. Therefore, DSPs and advertising networks

²⁰² See Michalis Pachilakis et al., *No More Chasing Waterfalls: A Measurement Study of the Header Bidding Ad-Ecosystem* (2019) <http://arxiv.org/abs/1907.12649> (last visited Jan 19, 2023).

²⁰³ See Veale and Zuiderveen Borgesius, *supra* note 31, at 32.

²⁰⁴ See Pachilakis et al., *supra* note 201.

²⁰⁵ See *OpenRTB (Real-Time Bidding)*, IAB TECH LAB, <https://iabtechlab.com/standards/openrtb/> (last visited Jan 19, 2023). See *Authorized Buyers Real-time Bidding Proto*, *supra* note 198.

²⁰⁶ See Veale and Zuiderveen Borgesius, *supra* note 31, at 232.

²⁰⁷ *Id.*

²⁰⁸ *Id.*

provide data-based algorithmic tools to estimate CTR into “quality scores”.²⁰⁹ Moreover, such advanced data analytic tools allow advertisers to observe how their advertisements perform (how consumers behave regarding their advertisements) and further tailor their campaigns based on these insights, creating a self-improving optimization cycle.²¹⁰ As the advertisers with more data and more accurate data about the consumer can better estimate such quality scores, the quantity and the quality of data about the consumers and their behavior determines the efficacy of ad optimization.²¹¹

2.4.2. Cookies and Mobile IDs

The most prevalent way to track consumers has been via trackers known as “cookies”.²¹² Cookies are small blocks of encoded or encrypted data that the website’s server places on the consumer’s computer (that visits the website) and later accesses and reads to identify the returning user.²¹³ In the early days of the internet, publishers could not tell the difference between visitors.²¹⁴ Cookies were introduced in 1994 by Netscape Navigator, primarily to “give Web a memory” or, in other words, to identify the re-visiting users on the website.²¹⁵ To illustrate: when the user requests the webpage www.example.com and the request contains no cookies, the server *example.com* presumes this is the first webpage the user visits, so it creates a unique identifier (a string of random numbers and letters) and sends it back to the browser together with the web page.²¹⁶ From this point onwards, whenever the user visits any webpage of *example.com*, the cookie will automatically be sent to the browser. This way, *example.com* has access to the log of information about when the user (singled out with the unique identifier) visited each page.

²⁰⁹ See European Parliament Study Online Advertising & Consumer Choice, *supra* note 36, at 18.

²¹⁰ See ZUBOFF, *supra* note 20, at 93–97.

²¹¹ See *About Quality Score*, GOOGLE ADS HELP, <https://support.google.com/google-ads/answer/6167118?hl=en> (last visited Jan 4, 2023). While general criteria of programmatic auctions are known, and analytics tools enable optimizing the campaigns for advertisers, algorithms that underlie these processes are essentially black-box. See CMA (UK) Study Online Platforms & Digital Advertising Final Report, *supra* note 33 at 16.

²¹² See Veale and Zuiderveen Borgesius, *supra* note 31, at 227–229.

²¹³ *Id.* at 227.

²¹⁴ “At that moment in Web history, every visit to a site was like the first, with no automatic way to record that a visitor had dropped by before. Any commercial transaction would have to be handled from start to finish in one visit, and visitors would have to work their way through the same clicks again and again; it was like visiting a store where the shopkeeper had amnesia.” John Schwartz, *Giving Web a Memory Cost Its Users Privacy*, THE NEW YORK TIMES, Sep. 4, 2001, <https://www.nytimes.com/2001/09/04/business/giving-web-a-memory-cost-its-users-privacy.html> (last visited Jan 5, 2023).

²¹⁵ See ZUIDERVEEN BORGESIUS, *supra* note 52, at 20.

²¹⁶ *HTTP Cookie*, WIKIPEDIA (2022), https://en.wikipedia.org/w/index.php?title=HTTP_cookie (last visited Jan 19, 2023).

Today, cookies are used for various purposes: they can be *strictly necessary* for enabling website features, for example, accessing secure areas of the website or adding items to a shopping cart.²¹⁷ They can also be used to *improve performance*, such as tracking errors or which website pages are most visited.²¹⁸ They can also enable other *functionalities*, for example, to keep users logged in or retain their preferences.²¹⁹ Such cookies are also called first-party cookies as they are placed by the server of the publisher’s website that the consumer visits (i.e., first-party). There are also *third-party* cookies placed by a party other than the publisher, such as an advertising network.

Initially, placing the third-party cookies was impossible because every web page typically contained digital content only from a single source – the website’s server. However, in 1996, Netscape Navigator 2.0 introduced the so-called “frame” – a function that allowed web page parts to be sourced from other servers.²²⁰ The frame function enabled website publishers to make the digital content of third parties available to consumers. For example, today, the frame function is used to embed a video uploaded on a video-streaming platform such as YouTube on other websites.²²¹ In addition, the “Same Origin Policy” of Navigator 2.0 provided a security protocol to limit the access to cookies to the party that placed them.²²² This entails, for example, that only YouTube’s server accesses the cookies it installed to deliver the video on the publisher’s website.

While third-party cookies can provide significant functionalities (e.g., showing a video from another source), they also allow tracking of the users across the internet and, therefore, have been used to operationalize OBA.²²³ For example, a 2015 study of 478 websites across eight EU member states found that 70% of the 16,555 cookies placed were third-party cookies, from which more than half were set by 25 domains that belonged to advertising intermediaries engaged in OBA.²²⁴ In practice, advertising intermediaries place tracking cookies by placing frames, also

²¹⁷ See European Parliament Study Consent in Targeted & Behavioral Advertising, *supra* note 36, at 44.

²¹⁸ *Id.*

²¹⁹ See Katie Moser, *How to Personalize Content Using First Party Cookies and Data*, ZESTY (May 11, 2022), <https://www.zesty.io/mindshare/how-to-personalize-content-using-first-party-cookies-and-data/> (last visited Jan 4, 2023).

²²⁰ See Veale and Zuiderveen Borgesius, *supra* note 31, at 228.

²²¹ See *Embed Videos & Playlists*, YOUTUBE HELP, <https://support.google.com/youtube/answer/171780?hl=en> (last visited Jan 19, 2023).

²²² See Veale and Zuiderveen Borgesius, *supra* note 31, at 4–5.

²²³ See Frederik Braun, *Origin Policy Enforcement in Modern Browsers* (Oct. 26, 2023) (unpublished PhD dissertation, Ruhr Universität Bochum).

²²⁴ See ARTICLE 29 DATA PROTECTION WORKING PARTY, *Cookie Sweep Combined Analyzis - Report*, 14/EN WP 229, 2 (2015).

called “tags” (or “web beacons”), on websites across the internet.²²⁵ These tags can be as big as the advertising box, a space in which an advertisement appears, but as small as a single pixel (“pixel tags” or “1x1 pixels”). For example, tags often take the form of clickable buttons, such as “LOG IN via Facebook” or “SUBSCRIBE to YouTube”.²²⁶

In addition to placing cookies, the tags serve several important functions for advertising intermediaries. Firstly, when the consumer accesses the web page, tags located on the page that they may not click or cannot even see trigger the initiation of specific actions, for example, of the RTB processes by creating “a bid request” described in the section 2.4.1.²²⁷ Most importantly, by spreading the tags on many different websites, the server of the tag can also combine the cookies placed on them and link the data collected on each website to a single consumer.²²⁸ However, not all intermediaries are equally able to spread their tags across the internet, and large platforms, such as belonging to Alphabet and Meta, are most successful in tracking consumers online.²²⁹ For example, the *WhoTracks.Me* study found that Alphabet was tracking around 40% of the measured Web traffic and Meta around 15%.²³⁰ As advertising networks place third-party cookies through the websites of many different publishers, they can link the user’s behavior across all of these websites and aggregate a vast amount of data about the individual to create a comprehensive profile.²³¹

Other advertising intermediaries (smaller DSPs and SSPs) that do not hold a strong intermediary position online cannot spread their tracking code via tags. However, in response to their needs to track users, develop comprehensive profiles, increase the quality scores, and make more efficient bids in the RTB auction, the industry found a loophole in the Single Origin Policy to bypass its rules by a process called “cookie syncing” (alternatively “cookie matching”).²³² To illustrate, one consumer is given different unique identifiers (cookieIDs) by two parties – TRACKER1 and TRACKER2. If the consumer first visits TRACKER1 and then the web

²²⁵ Tags are sometimes also called as “tracking pixels”, “web bugs”, “pixel tags”, and “clear GIFs”. See Janne Nielsen, *Using Mixed Methods to Study the Historical Use of Web Beacons in Web Tracking*, 2 INT’L J. DIGITAL HUMAN. 1 (2021).

²²⁶ See Janice Sipior, Burke Ward & Rubén Mendoza, *Online Privacy Concerns Associated with Cookies, Flash Cookies, and Web Beacons*, 10 J. INTERNET COM. 1, 4 (2011).

²²⁷ See *Web Beacon*, NAI: NETWORK ADVERTISING INITIATIVE, <https://thenai.org/glossary/web-beacon/> (last visited Jan 4, 2023).

²²⁸ See Nielsen, *supra* note 225, at 4.

²²⁹ See Veale and Zuiderveen Borgesius, *supra* note 31, at 228.

²³⁰ Arjaldo Karaj et al., *WhoTracks.Me: Shedding Light on the Opaque World of Online Tracking*, 8–9 (2019), <http://arxiv.org/abs/1804.08959> (last visited Jan 19, 2023).

²³¹ See European Parliament Study Consent in Targeted & Behavioral Advertising, *supra* note 36, at 44.

²³² Veale and Zuiderveen Borgesius, *supra* note 31, at 229.

page of TRACKER2, TRACKER1 can include the cookieID it assigned to a consumer in the URL.²³³ This allows the tracker to link both cookies to a single user and combine the available data. Cookie syncing significantly widened the scope of tracked activity online by pooling the reach of multiple trackers.²³⁴ Average consumers visiting a website are unaware that the browser window of a website is sourced from several website servers and that numerous parties track their behavior by placing cookies, raising concerns about consumer privacy.²³⁵

In contrast to the Web, accessed via web browsers, mobile app developers traditionally had more freedom to track mobile users via mobile advertising identifiers (MAIDs).²³⁶ The most prevalent MAIDs in the EU are Google Advertising ID (GAID), which is placed on the Android operating system and was installed on 69% of mobile devices in 2022, and Apple Identifier for Advertisers (IDFA) on iOS, installed on 30% of devices.²³⁷ In the Android ecosystem, one study found that Alphabet tracked 88.4% of the mobile apps and Meta 33.9%.²³⁸ Empirical studies for analyzing tracking in mobile apps in the Apple iOS system are scarce.²³⁹ Lastly, third-party apps and plug-ins have a variety of ways to access the unique identifiers of mobile devices, such as phone numbers, SIM numbers, or MAC addresses.²⁴⁰ Such a variety of identifiers are also used to link a mobile device to other devices (e.g., desktop computers), as providing OBA is among several purposes of cross-device tracking.²⁴¹

2.4.3. Cookieless OBA

Due to the concerns about consumer privacy, reliance on cookies and MAIDs for OBA is a highly controversial and heavily regulated practice. The EU privacy and data protection law sets high standards for cases in which processing data via trackers can be considered lawful (Section 6.1.2). It is increasingly difficult for advertising intermediaries to place third-party advertising cookies legitimately. Partly due to the pressure from the regulators, web browsers and device manufacturers started to move away from OBA based on third-party tracking.

²³³ URL may look like <http://tracker2.com?tracker1cookieID=mv&fzb228>. *Id.* at 228.

²³⁴ 53 companies observe more than 91% browsing behavior of all internet users. *Id.* at 229.

²³⁵ *See Id.* at 229–230.

²³⁶ *See Id.* at 229.

²³⁷ European Commission Study Recent Digital Advertising Developments, *supra* note 36 at 41.

²³⁸ *See* Reuben Binns et al., *Third Party Tracking in the Mobile Ecosystem*, in PROCEEDINGS 10TH ACM CONF. ON WEB SCI. 23 (2018), <http://arxiv.org/abs/1804.03603> (last visited Jan 19, 2023).

²³⁹ *See* Veale and Zuiderveen Borgesius, *supra* note 31, at 229.

²⁴⁰ *See Id.* at 8.

²⁴¹ *See* Sebastian Zimmeck et al., *A Privacy Analysis of Cross-Device Tracking*, in PROCEEDINGS 26TH USENIX SECURITY SYMPOSIUM IS SPONSORED BY USENIX (2017).

In 2019, Mozilla’s Firefox adopted a default configuration to disable third-party cookies for advertising unless activated by the user, and in 2020, a similar feature was adopted by Apple’s Safari.²⁴² Despite owing much of its financial success to third-party cookies, Alphabet announced that Chrome—which has 65% of the web browser market²⁴³—would follow Firefox and Safari in disabling third-party cookies as the default configuration in 2023.²⁴⁴ However, Alphabet later announced that it would delay the phase-out until the second part of 2024.²⁴⁵ Similar dynamic is unfolding for the mobile trackers. In 2021, Apple introduced the App Tracking Transparency Framework, which disabled a default possibility to track third-party apps for advertising purposes, which has caused considerable disruption to the OBA markets.²⁴⁶ Meta was particularly affected by these changes – its stock price dropped 26% as it anticipated a \$10 billion loss in revenue.²⁴⁷

As the OBA industry is forced to move away from tracking based on third-party cookies, it started looking for other ways to connect users with their browsing records to compile their behavioral profiles.²⁴⁸ “Device fingerprinting” is one such method by which seemingly insignificant information about the features of the device, such as screen resolution and the list of installed fonts, are analyzed to give the device a unique “fingerprint”.²⁴⁹ This fingerprint can be used, for example, to

²⁴² See Marissa Wood, *Today’s Firefox Blocks Third-Party Tracking Cookies and Cryptomining by Default*, THE MOZILLA BLOG (Sep. 3, 2019), <https://blog.mozilla.org/en/products/firefox/firefox-news/todays-firefox-blocks-third-party-tracking-cookies-and-cryptomining-by-default/> (last visited Jan 5, 2023). See Nick Statt, *Apple Updates Safari’s Anti-Tracking Tech With Full Third-Party Cookie Blocking*, THE VERGE, Mar. 24, 2020, <https://www.theverge.com/2020/3/24/21192830/apple-safari-intelligent-tracking-privacy-full-third-party-cookie-blocking> (last visited Jan 5, 2023).

²⁴³ See *Browser Market Share Worldwide*, STATCOUNTER GLOBAL STATS, <https://gs.statcounter.com/browser-market-share> (last visited Jan 5, 2023).

²⁴⁴ See Dieter Bohn, *Google Chrome Third-Party Cookies Block Delayed Until 2023*, THE VERGE, Jun. 24, 2021, <https://www.theverge.com/2021/6/24/22547339/google-chrome-cookiepocalypse-delayed-2023> (last visited Jan 5, 2023). See Matt Burgess, *Google Has a New Plan to Kill Cookies. People Are Still Mad*, WIRED, Jan. 27, 2022, <https://www.wired.com/story/google-floccookies-chrome-topics/> (last visited Jan 5, 2023).

²⁴⁵ See Kyle Wiggers, *Google Delays Move Away from Cookies in Chrome to 2024*, TECHCRUNCH, Jul. 27, 2022, <https://techcrunch.com/2022/07/27/google-delays-move-away-from-cookies-in-chrome-to-2024/> (last visited Jan 19, 2023). See Anthony Chavez, *Expanding Testing for the Privacy Sandbox for the Web*, GOOGLE: THE KEYWORD (Jul. 27, 2022), <https://blog.google/products/chrome/update-testing-privacy-sandbox-web/> (last visited Jan 19, 2023).

²⁴⁶ See Jacob Loveless, *Council Post: How Does Apple’s App Tracking Transparency Framework Affect Advertisers?*, FORBES, Aug. 22, 2022, <https://www.forbes.com/sites/forbesbusinesscouncil/2022/08/22/how-does-apples-app-tracking-transparency-framework-affect-advertisers/> (last visited Jan 5, 2023).

²⁴⁷ See Daniel Newman, *Apple, Meta And The \$10 Billion Impact Of Privacy Changes*, FORBES, Feb. 10, 2022, <https://www.forbes.com/sites/danielnewman/2022/02/10/apple-meta-and-the-ten-billion-dollar-impact-of-privacy-changes/> (last visited Jan 19, 2023).

²⁴⁸ See Zard and Sears, *supra* note 1, at 816.

²⁴⁹ See *Cover Your Tracks*, ELECTRONIC FRONTIER FOUNDATION, <https://coveryourtracks EFF.org/learn> (last visited Jan 19, 2023).

combat fraud (e.g., identifying a person trying to log in to a site is likely an attacker who stole the credentials), but also to track a single consumer across different websites without their knowledge and without a way of opting out.²⁵⁰ Device fingerprinting allows tracking users without cookies, but also it can be used to respawn deleted identifiers in case the consumer deletes cookies.²⁵¹ Research found fingerprinting evidence on at least 4.4%–5.5% of top websites.²⁵² However, as fingerprinting is challenging to observe, these numbers can be regarded as the lower bounds.²⁵³

While device fingerprinting provides an alternative privacy-invasive tracking practice, some initiatives have successfully demonstrated the possibility of creating consumers' behavioral profiles while preserving the confidentiality of the data. One example is the web browser *Adnostic* which, since 2010, allows the creation of a behavioral profile of users and uses them to target them with advertisements without sharing any of the data with other parties.²⁵⁴ Similar privacy-preserving OBA alternatives such as Privad, AdVeil, and Brave are slowly entering the market.²⁵⁵ Alphabet has also started an initiative called Privacy Sandbox, in which the company considers various OBA alternatives that preserve the confidentiality of data – that is, not share data with third-party providers. One such alternative that was shelved is called Federated Learning of Cohorts (FLoC).²⁵⁶ Instead of assigning unique identifiers to the users, like in the case of cookies, using FLoC, a web browser would analyze users' browsing behavior and assign consumers to “cohorts”, i.e., clusters of consumers with similar browsing behavior and presumably similar habits and interests.²⁵⁷ Other similar approaches explored by Alphabet are Topics

²⁵⁰ See Nick Nikiforakis et al., *Cookieless Monster: Exploring the Ecosystem of Web-Based Device Fingerprinting*, in IEEE SYMPOSIUM SECURITY & PRIVACY 541 (2013), <https://www.computer.org/csdl/proceedings-article/sp/2013/4977a541/12OmNCwlalM> (last visited Jan 4, 2023).

²⁵¹ See Veale and Zuiderveen Borgesius, *supra* note 31, at 21.

²⁵² See Gunes Acar et al., *The Web Never Forgets: Persistent Tracking Mechanisms in the Wild*, in CCS '14: PROCEEDINGS ACM SIGSAC, <https://dl.acm.org/doi/epdf/10.1145/2660267.2660347> (last visited Jan 4, 2023).

²⁵³ See Veale and Zuiderveen Borgesius, *supra* note 31, at 230.

²⁵⁴ See Vincent Toubiana et al., *Adnostic: Privacy Preserving Targeted Advertising*, in PROCEEDINGS OF THE NETWORK AND DISTRIBUTED SYSTEM SYMPOSIUM (March 2010), <https://crypto.stanford.edu/adnostic/adnostic-ndss.pdf>. See also *Adnostic: Privacy Preserving Targeted Advertising*, ADNOSTIC, <https://crypto.stanford.edu/adnostic/> (last visited Jan 19, 2023).

²⁵⁵ See Micah Altman et al., *Practical Approaches to Big Data Privacy over Time*, 8 INT'L DATA PRIVACY L. 29 (2018). See European Commission Study Recent Digital Advertising Developments, *supra* note 36, at 157.

²⁵⁶ See *Federated Learning of Cohorts (FLoC)*, THE PRIVACY SANDBOX, <https://privacysandbox.com/proposals/floc/> (last visited Jan 19, 2023).

²⁵⁷ *Id.*

API²⁵⁸ and FLEDGE.²⁵⁹ These approaches aim at replacing functionality served by cross-site tracking but maintain detailed lifestyle targeting of OBA.²⁶⁰ Using Privacy Sandbox alternatives for OBA can mitigate personal data breach and confidentiality concerns, but it is likely to not be able to address concerns about consumer manipulation and exploitation in general. The industry is moving away from OBA based on third-party tracking into browser-based or local OBA, further centralizing power in advertising markets with large platform providers.

2.5. Conclusion: Online Behavioural Advertising

This section summarizes Chapter 2 to answer the first sub-question of the thesis:

SQL1: what is online behavioral advertising (OBA)?

Online behavioral advertising (OBA) is an online phenomenon that involves showing consumers advertisements that are personalized based on their behavioral data. OBA has three cumulative components: (i) advertisement is targeted to individual consumers, (ii) targeting is based on the consumers' observed behavior, and (iii) consumer behavior is observed *and/or* the consumer is targeted online. OBA reflects the advertising paradigm based on three premises: (i) targeting individual consumers with advertisements is beneficial for advertisers and possibly consumers, (ii) observed consumer behavior reveals what a consumer reacts to better than surveying, and (iii) the Internet can be used to observe and influence consumer behavior.

OBA can be understood as one of several configurations of online advertising that actualizes this paradigm. As a configuration, OBA is a particular form of online personalized advertising that entails targeting an individual consumer sorted into segments based on interests ("surf enthusiast") or detailed demographic traits ("household income top 10%") that AI systems inferred based on behavioral data about the consumer. Consumer behavioral data may include, among others, consumer Web browsing or social media behavior, mouse cursor movements, geo-location, or keyboard strokes.

Typically, publishers offer OBA configuration to advertisers on their online advertising dashboards. Platform providers such as Alphabet and Meta are the most prominent publishers allowing advertisers to advertise on websites and apps

²⁵⁸ See *Topics API overview*, CHROME FOR DEVELOPERS (2022), <https://developer.chrome.com/docs/privacy-sandbox/topics/overview/> (last visited Oct 11, 2023).

²⁵⁹ See Altman et al., *supra* note 255; See European Commission Study Recent Digital Advertising Developments, *supra* note 36, at 157.

²⁶⁰ See Shanika Wickramasinghe & Miklos Zoltan, *A Complete Guide To Google FLoC - What It Does and How It Works - How FloC Affects Privacy*, PRIVACY AFFAIRS (Apr. 25, 2023), <https://www.privacyaffairs.com/google-floc/> (last visited Jan 19, 2023).

provided by other publishers that join their networks (e.g., Google Display Network, Meta Audience Network). These advertising networks are closed ecosystems where platforms control OBA sales and are called “walled gardens”. Google dominates the search advertising market, and Meta dominates the social media advertising market. Google also dominates open exchange intermediation for display advertising, where all networks and publishers compete for advertising spaces over the Internet.

To execute OBA configurations, platforms, publishers, intermediaries, and networks, track consumers over the Internet, and compete in real-time bidding (RTB) auctions. RTB is typically won by the party with the most data about the consumer, resulting in competition in extracting consumer data. In sum, OBA is a configuration of online advertising that requires the processing of consumer behavioral data that platforms are most well-positioned to collect and monetize. The interest of platforms that advertisers select OBA between different advertising configurations results in cementing the online infrastructure for consumer surveillance in the online environment. The industry is moving away from OBA based on third-party tracking into browser-based or local OBA, further centralizing power in advertising markets with large platform providers.