

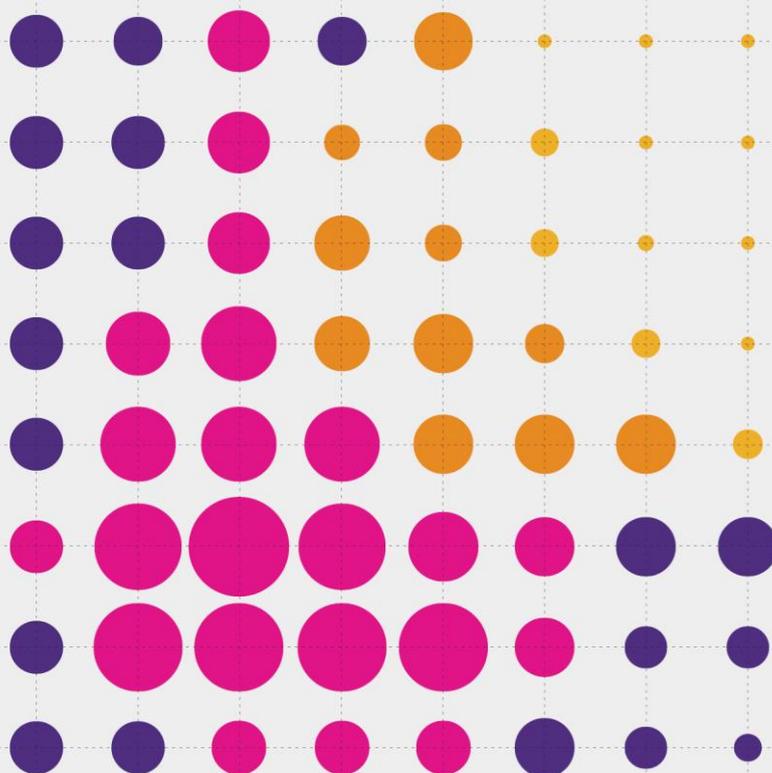


Online advertising in the UK

A report commissioned by the Department for Digital,
Culture, Media & Sport

January 2019

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About Plum

Plum is an independent consulting firm, focused on the telecommunications, media, technology, and adjacent sectors. We apply extensive industry knowledge, consulting experience, and rigorous analysis to address challenges and opportunities across regulatory, radio spectrum, economic, commercial, and technology domains.



About this study

This study for the Department of Digital, Culture, Media & Sport explores the structure of the online advertising sector, and the movement of data, content and money through the online advertising supply chain. It also assesses the potential for harms to arise as a result of the structure and operation of the sector.

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Executive summary

Introduction

The Department of Digital, Culture, Media & Sport (DCMS) commissioned Plum Consulting to provide an independent analysis of the structure of the online advertising sector; the movement of data, content and money through the online advertising value chain; and potential harms that can arise from online advertising. This work feeds into the Cairncross Review into the sustainability of the UK press sector and the Government's Digital Charter work programme to ensure the UK is the safest place to be online and the best place to start and grow a digital business.

The project was conducted in November and December 2018 and involved a short review of publicly available information and interviews with 24 industry stakeholders. There is limited available data about the UK online advertising market – consequently, we have made indicative estimates of certain data, such as market shares and money flows. The online advertising market is highly complex – consequently, we have had to generalise and simplify in order to provide this baseline research. The market is evolving at a fast pace - this report presents a snapshot of the market at the time of writing.

Taxonomy of online advertising

Online advertising is the use of online services to deliver paid-for messaging. While we refer to political advertising in the report, the focus is on commercial advertising. There are three main types of online advertising in terms of the form and function of the advertising and how it appears to consumers: search, display and classifieds.

Figure 1: Taxonomy of internet advertising formats¹

Category		Description	Examples
Search		Paid-for listing in search results, such as sponsored or promoted listings	Sponsored links on Google.co.uk web search results
Display ²	Banner	Advertising shown in standard display units on webpages or in apps - ad content types include images and animations	Banner advertising appearing at the top of pages on FT.com
	Native	Advertising integrated into the surrounding content, predominantly in-feed advertising such as promoted posts in social feeds or paid-for recommendations on webpages	Sponsored product links appearing on an Instagram feed Facebook carousel image ads 'Promoted links from around the web recommended by Outbrain' appearing below articles on The Guardian app
	Sponsored content	Advertiser-sponsored content on a webpage or app such as in ad-features/advertorials	Sponsored articles on BuzzFeed.com
	Out-stream video	Video advertising shown in non-video content	Video advertising appearing in ad units within text articles on Mirror.co.uk
	In-stream video	Video advertising shown before, during or after video content – also known as pre- and post-roll video	30-second video ads show within programming on ITV Player 6-second bumper video ads shown before YouTube videos
Classifieds		Paid listings such as recruitment, property, cars and services	Paid-for listings on Yell.com and Autotrader.com
Other		Audio advertising and lesser-used formats such as solus email, lead generation and mobile SMS/MMS. Emerging online advertising formats, such a virtual reality (VR) and augmented reality (AR).	Audio advertising on Spotify Jaguar Land Rover ad using AR on mobile ads to show users a car overlaid on their surroundings ³

In addition to online advertising, brands use online platforms for other forms of marketing not generally considered to be online advertising, such as influencer marketing and product placement. This can involve brands paying social media influencers to mention advertisers' products and services in their social media output.

Online display advertising is often targeted to reach the right people, at the right time in the right context in order to achieve an advertiser's objectives. The main types of targeting used in online advertising include contextual (e.g. content attributes), demographic (e.g. age, gender), behavioural (e.g. interests inferred from

¹ Elaborated from a segmentation used by the IAB and PwC to report online advertising expenditure in the UK.

² Display also includes other, lesser-used display formats, such as tenancies (sponsorship of a website or sections of a website) and interruptive formats.

³ Available at: <https://www.campaignlive.co.uk/article/new-banner-ad-jaguar-land-rover-lets-test-drive-car-phone/1435358> [Accessed on 8 Dec 2018]

user web browsing), retargeting (e.g. targeting users to recapture interest in products or services after they have browsed away from an ecommerce site), personalised (e.g. content personalised to an individual, based on user data).

The online advertising market is evolving fast. Emerging online advertising formats include augmented reality (e.g. sponsored AR lenses), virtual reality (e.g. 360 video ads), dynamic content optimisation (e.g. creating different ads for each user) and voice advertising (e.g. paid search results on voice assistants). Increasingly, trading techniques developed for online advertising are being applied to advertising on other platforms such as television and digital out of home (e.g. digital billboards).

Market size and growth

The internet advertising industry has grown very strongly as online media consumption has increased and advertisers have allocated more budget to online. UK internet advertising expenditure increased from £3,508m in 2008 to £11,553m in 2017, a compound annual growth rate of 14%. In 2017, internet advertising overtook all other forms of advertising (television, press, radio, cinema and outdoor) combined, to reach 52% share of total advertising spending⁴.

Paid for search is the largest category of online advertising, accounting for 50% of the UK online advertising market in 2017, compared to 36% for display, 13% for classifieds and 1% other formats⁵. Mobile accounts for an increasing share of the online advertising market, with smartphone expenditure accounting for 45% of total online advertising in 2017, compared to 37% in 2016.

Of the internet display advertising market, video (£1.6bn) accounts for the largest share, followed by banners (£1.3bn) and native (£1.0bn). Social media (mainly Facebook and YouTube) accounts for an increasing share of display advertising. In 2017, 57% of online display advertising expenditure was on social media compared to 49% in 2016⁶.

⁴ IAB. (2017). *Digital Adspend- IAB / PwC Digital Adspend Study*. Available at: <https://www.iabuk.com/adspend/full-year-2017-digital-adspend-results>

⁵ IAB. (2017). *Digital Adspend- IAB / PwC Digital Adspend 2017*. Available at: <https://www.iabuk.com/research/digital-adspend> [Accessed on 16 Nov 2017]

⁶ Plum Analysis of IAB / PwC Digital Adspend 2017 data

Figure 2: Summary of UK online advertising expenditure by segment, 2017⁷

£5.8bn	Search	Paid search advertising on Google, Bing and other search engines
£2.4bn	Social display	Display advertising on Facebook, Instagram, Snap ⁸ , Twitter and LinkedIn
£1.8bn	Other display	Banner, video and native display advertising on other sites and apps
£1.5bn	Classifieds	Paid classifieds listings

Value chain and roles

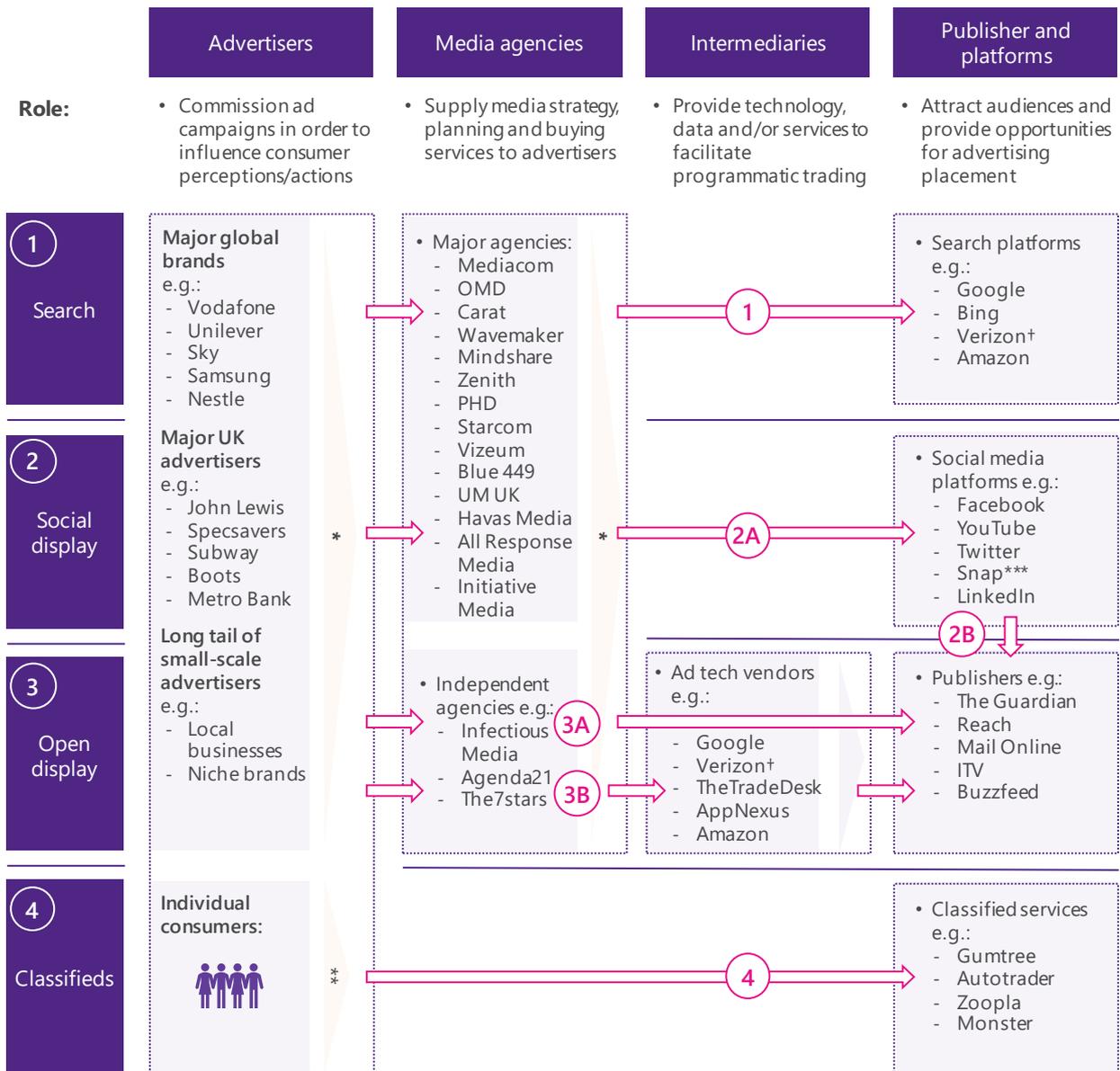
The online advertising value chain involves advertisers and their media agencies (the demand side) buying advertising from publishers⁹ and search and social media platforms (the supply side). Trading between these partners may be direct or involve one or more intermediaries.

⁷ IAB. (2017). *Digital Adspend- IAB / PwC Digital Adspend 2017*. Available at: <https://www.iabuk.com/research/digital-adspend> [Accessed on 16 Nov 2017]

⁸ Snap is generally included in the social display category, although it describes itself as a camera and communications company.

⁹ In this report, we use the term publisher broadly to refer to any organization that attracts an audience to content or service it provides.

Figure 3: Overview of the online advertising value chain



➡ = buying of advertising and flow of funds

* = Advertisers and agencies large and small buy across search, social and display

** = Some advertisers, as well as consumers, buy classifieds

*** = Snap is generally included in the social display category, although it describes itself as a camera and communications company.

† = Verizon Media Group (formerly Oath)

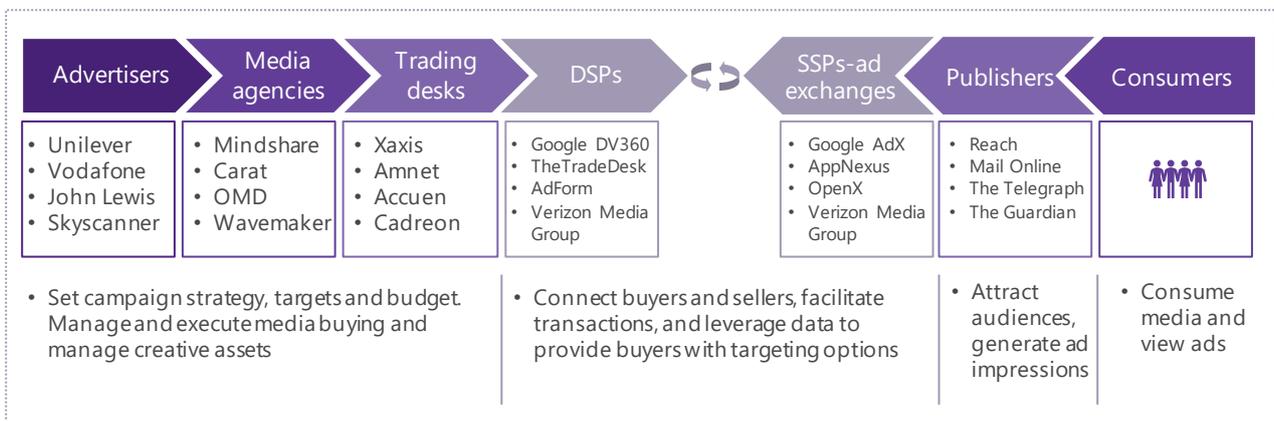
The structure of the value chain differs between the four main categories of online advertising. In search (1) and social display (2A), advertisers or their agencies buy direct from search or social platforms. In some cases, publishers distribute content on social media platforms and allow these platforms to sell advertising (2B). The open display value chain involves a complex ecosystem of intermediaries that enable programmatic trading - some advertising inventory is sold direct (3A) and some via these intermediaries (3B). Classifieds involves individuals or SMEs buying direct from classifieds providers. Major internet companies, such as Google and Facebook, have developed automated "self-service" online sales interfaces for sales of advertising to large numbers of media agency and advertiser customers, including a long tail of small businesses.

The complexity of the open display advertising market value chain is a consequence of the development of programmatic trading. *Programmatic trading is the use of automated systems and processes to buy and sell inventory. This includes, but is not limited to, trading that uses real time bidding auctions*¹⁰. In 2017, 80% of online display advertising (including social display and open display) was sold programmatically¹¹. When a consumer visits a web page the publisher's technology platform reviews any existing orders and sends a bid request to other potential buyers who then evaluate the advertising slot and make bids – within a fraction of a second. Programmatic trading involves high volumes of transactions daily in the UK - hundreds of millions or billions.

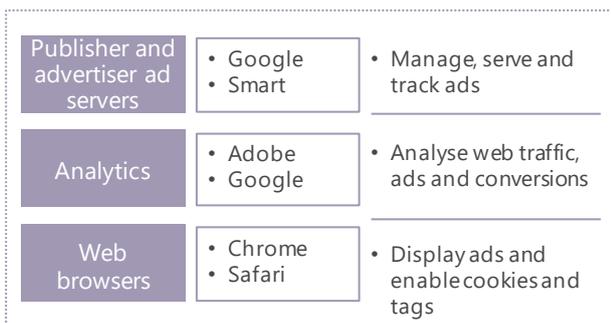
In the online display advertising value chain, intermediaries add value by connecting buyers and sellers, facilitating trading, in some cases involving auctions, and leveraging user data and analytics to target advertising. They generally charge commission fees or revenue share and/or technology fees. The value chain also involves providers of supporting technologies and data services.

Figure 4: Programmatic online display advertising value chain – simplified and generalised¹²

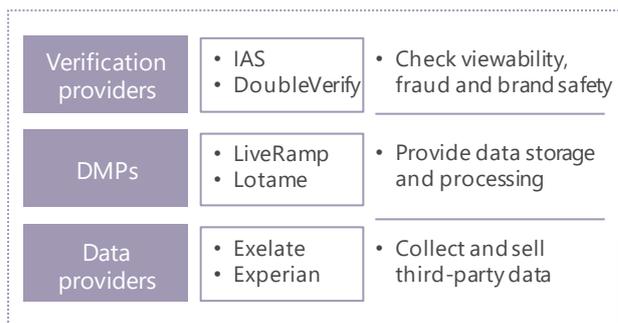
SUPPLY, DEMAND AND MARKETPLACE



SUPPORTING TECHNOLOGIES



DATA SERVICES



Market participants often form multiple parallel trading paths that compete for advertising impressions. This phenomenon is driven by the incentive for publishers to maximise the number of demand sources they connect to and vice versa. As a consequence, publishers generally plug into multiple supply sources, with revenue coming through different paths.

¹⁰ IAB. (2014). *The Programmatic Handbook*. Available at: <https://www.iabuk.com/sites/default/files/The%20Programmatic%20Handbook.pdf> [Accessed on 16 Nov 2018]

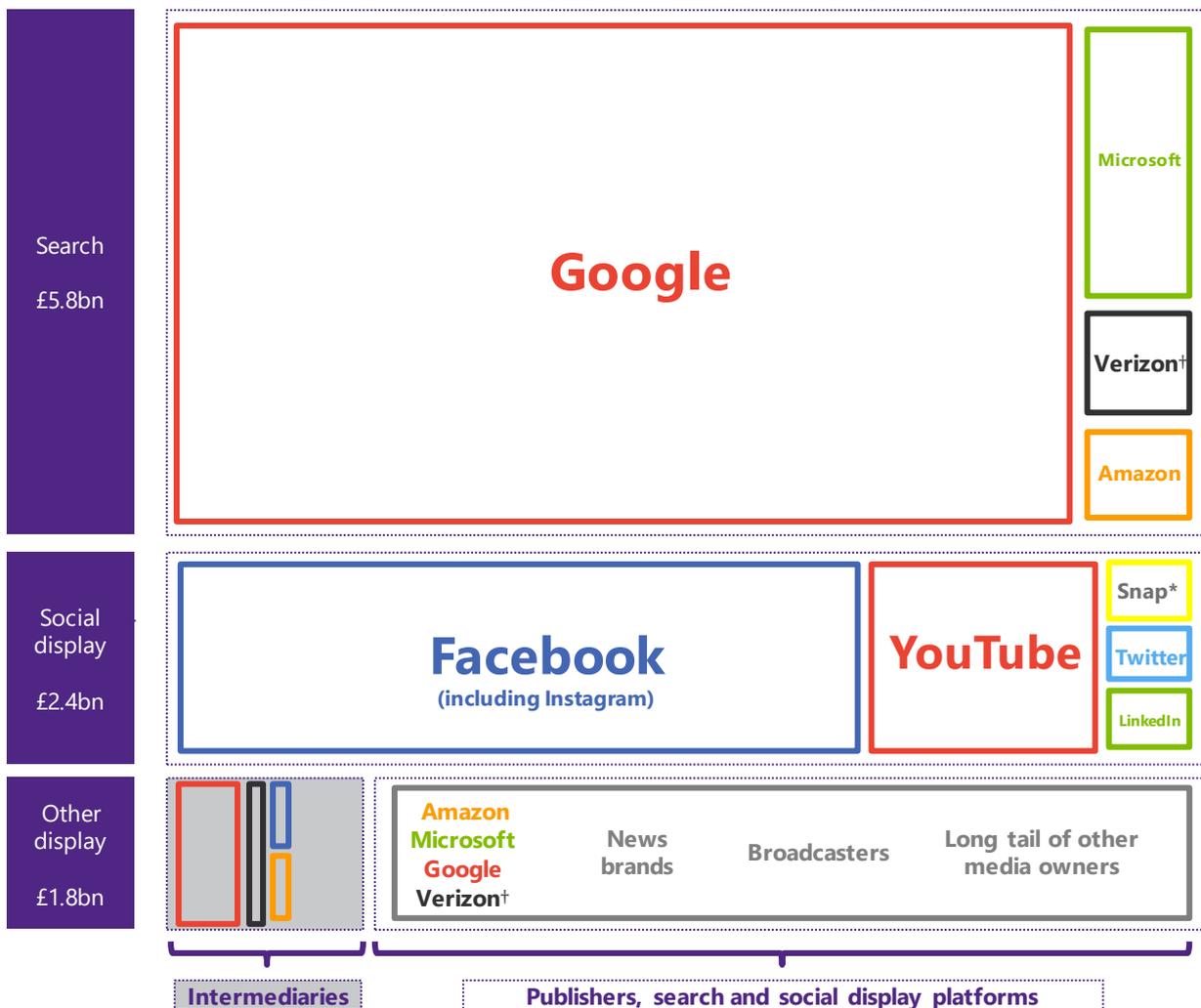
¹¹ IAB. (2017). *IAB / PwC Media Owner Sales Techniques*. Available at: <https://www.iabuk.com/research/iab-pwc-media-owner-sales-techniques-most-2016> [Accessed on 17 November 2018]

¹² In some cases, SSPs-ad exchanges resell inventory on other ad exchanges leading to an extra step in the path between publisher and DSP.

Market dynamics

In the online advertising market, publishers and social media platforms compete for share of audience and advertising expenditure whilst advertising technology vendors compete for intermediary services revenue. Major US internet companies capture the majority of search and display online advertising expenditure in the UK. They generate revenue in their roles as search or social media platforms and as intermediaries in the sale of display advertising by third-party publishers. The following indicative estimates show the relative scale of major competitors.

Figure 5: Indicative share of online advertising expenditure by major competitors, 2017¹³



Ownership: □ = Google □ = Facebook □ = Microsoft □ = Verizon □ = Amazon □ = Snap □ = Twitter □ = Other

* Snap is generally included in the social display category, although it describes itself as a camera and communications company.

† Verizon Media Group (formerly Oath)

Google and Facebook and, to a lesser extent, Amazon (GFA) have a unique scale and breadth of activity in the online advertising market, complemented by businesses in adjacent markets. In particular, GFA are distinguished

¹³ Areas are proportional to advertising expenditure. Expenditure is net of agency share and, in the case of publishers, any intermediary take. It is gross of any pay-out to third-party publishers (YouTube) or traffic sources (search). Based on PwC/IAB expenditure data (category totals) triangulated with market share data from industry interviews and other benchmarks – see appendix. Publishers in the ‘other display’ segment are unevenly disintermediated. Major broadcasters generally do not sell inventory on open exchanges and retain a high share of agency investment relative to press publishers.

by a large scale of owned advertising inventory, well-developed advertising technology platforms (particularly Google), technologies in adjacent markets (such as Google Chrome and Android), and extensive proprietary data. They operate data “walled gardens” collecting user data from various sources but sharing only aggregated data with partners.

As a consequence of their high market share, ownership of key technologies and strong user data assets, Google and Facebook are, to some extent, able to set their own terms to advertisers and publishers. For example, although they allow third-party measurement of audiences, campaign performance and effectiveness, some experts believe that this measurement is not fully independent and transparent and might overstate performance metrics. In addition, to comply with the General Data Protection Regulation (GDPR), Google stopped partner access to user ID data, limiting advertisers’ ability to track and buy audiences across platforms.

In the programmatic intermediary market (for non-video display advertising), Google is market leader on the supply side (estimated 30% to 50% market share in the UK) and the demand side (25% to 35%) and accounts for 80% to 90% of both publisher and advertiser ad server installations. In some cases, Google technology manages publisher ad inventory, runs programmatic auctions and bids in these auctions against third-party ad tech vendors. Some interviewees noted that this is a conflict of interest – for example, Google demand having a preference for Google supply. However, some interviewees highlighted that Google had stopped certain ad server practices that used to give its ad exchange an advantage over rivals.

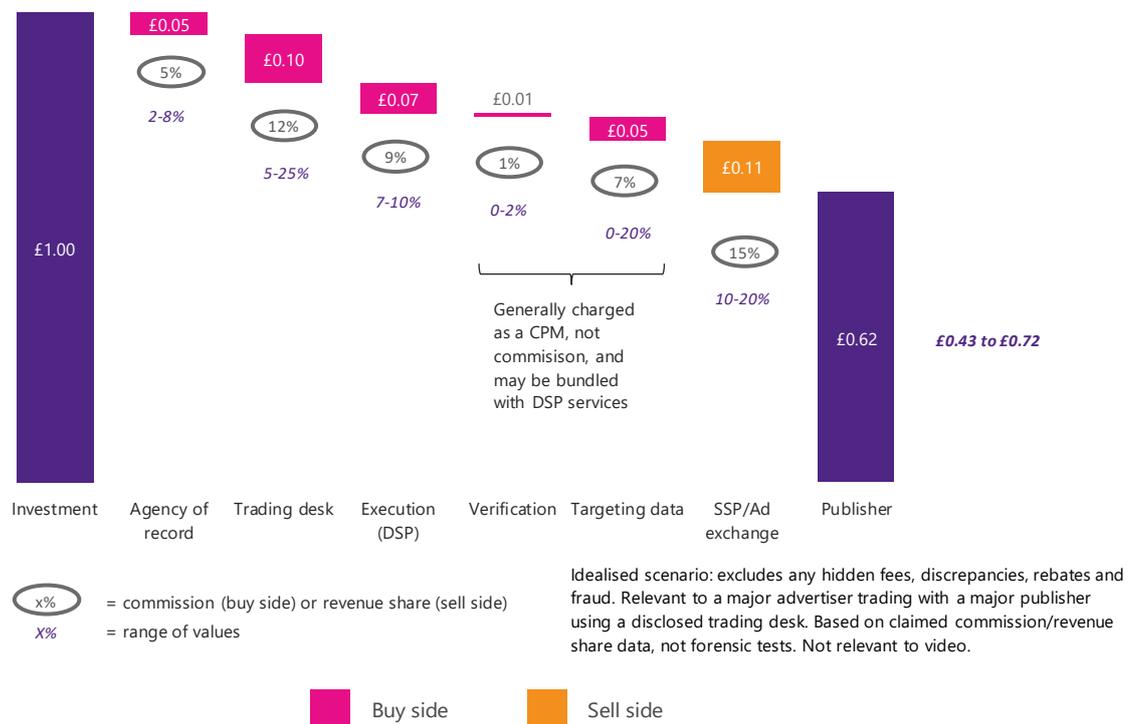
Money flows

In the programmatic advertising market, money flows from advertisers to publishers (press and other) via a series of intermediaries who are paid a share of the media expenditure, a CPM, a fixed fee or by results. Given the current programmatic advertising market structure and practices, it is not possible to develop robust, independently verified, census level data for the share of advertiser investment received by publishers – the market is too complex and opaque. We developed indicative estimates based on feedback from a small number of industry experts.

Our best estimate is that publishers receive about £0.62 (range £0.43 to £0.72) of every pound of advertiser investment in display (excluding video) in a programmatic open exchange scenario in an idealised case, excluding any hidden fees, discrepancies and fraud¹⁴. This estimate is based on claimed commissions/revenue shares, not a forensic analysis of trading, and is higher than other industry estimates.

¹⁴ Hidden fees and arbitrage have the potential to reduce publisher share compared to our estimates. Some experts highlighted that hidden fees are difficult to detect and likely to be continuing in parts of the market.

Figure 6: Share of advertiser investment – programmatic indirect (open exchange) sales of display ads - UK



The World Federation of Advertisers estimated that publishers receive 40% of advertiser investment¹⁵ (2014), ANA, ACA, Ebiquity, AD/FIN estimated 39% to 46%¹⁶ (2015-16), and The Guardian found that it received 30% in “worst case scenarios”¹⁷ in tests of buying its own inventory (2016). Interviewees reported that intermediary share has decreased since these estimates were made¹⁸ and in December 2018, The Guardian Chief Revenue Officer stated that “We replicated the test [buying own inventory] recently and it showed a split we were happy with.”¹⁹

The share of advertiser investment that publishers receive varies significantly on an impression-by-impression basis depending on the vendors involved, the size of the advertiser and publisher and the type of advertising campaign. The combination of a high-priced agency, trading desk, DSP and SSP, and large data fees, could leave a publisher with less than £0.45 in the pound.

Scenarios in which the publisher has a direct relationship with the buyer are more favourable in terms of share of advertiser investment received. In the case of programmatic guaranteed deals, publishers receive £0.75 in the pound in an idealised case. In the private marketplace scenario, publishers receive £0.67 in an idealised case. However, these sales methods are less prevalent than the use of open exchanges.

Intermediaries add value by connecting buyers and sellers, facilitating trading and layering on data and segmentations to enable targeting. Most interviewees believed that most intermediaries provide valuable

¹⁵ World Federation of Advertisers (WFA). (2014). *WFA guide to What Every Advertiser Should Know about Media Markets Programmatic Media*. Available at: <https://www.wfanet.org/app/uploads/2017/04/programmatic.pdf> [Accessed on 17 Nov 2018]

¹⁶ Ebiquity, ANA, ACA, Ad/Fin. (2017). *Programmatic: Seeing through the financial fog. An In-Market Analysis of Programmatic Media at the Transaction Level*. Available at: <https://www.acaweb.ca/en/wp-content/uploads/sites/2/2017/07/2017-ACA-ANA-Programmatic-Study-FINAL.pdf> [Accessed on 19 Nov 2017]

¹⁷ Pidgeon, D. (2016). *Where did the money go? Guardian buys its own ad inventory*. Available at: <https://mediatel.co.uk/newsline/2016/10/04/where-did-the-money-go-guardian-buys-its-own-ad-inventory/> [Accessed on 19 Nov 2017]

¹⁸ We estimate that over the last 2-3 years this decrease represents up to £0.15 of every pound of advertiser investment.

¹⁹ Davies, J. (2018). ‘GDPR will ultimately be good for the industry’: Guardian CRO Hamish Nicklin on 2019 plans. Available at: <https://digiday.com/media/gdpr-will-ultimately-good-industry-guardian-cro-hamish-nicklin-2019-plans/> [Accessed on 17 November 2018]

services and invest in technology and people in order to deliver these services – and that they are not a “tech tax”.

Data flows

Data is the lifeblood of the online advertising industry, enabling brands to target advertising and to analyse campaign performance and impact. Data types include user data (demographic, interest, browsing, location, purchasing), device data (browser, operating system), contextual data (ad format, environment) and campaign data. The main sources of data are advertisers (customer data), publishers (browsing data, sign-up data), major internet companies such as Facebook (vast array of data such as location, communications, network of friends, contacts), and specialist data providers. Data may be first-party (collected directly from consumers), second-party (first-party data shared directly with a partner) or third-party data (data sold on via an intermediary).

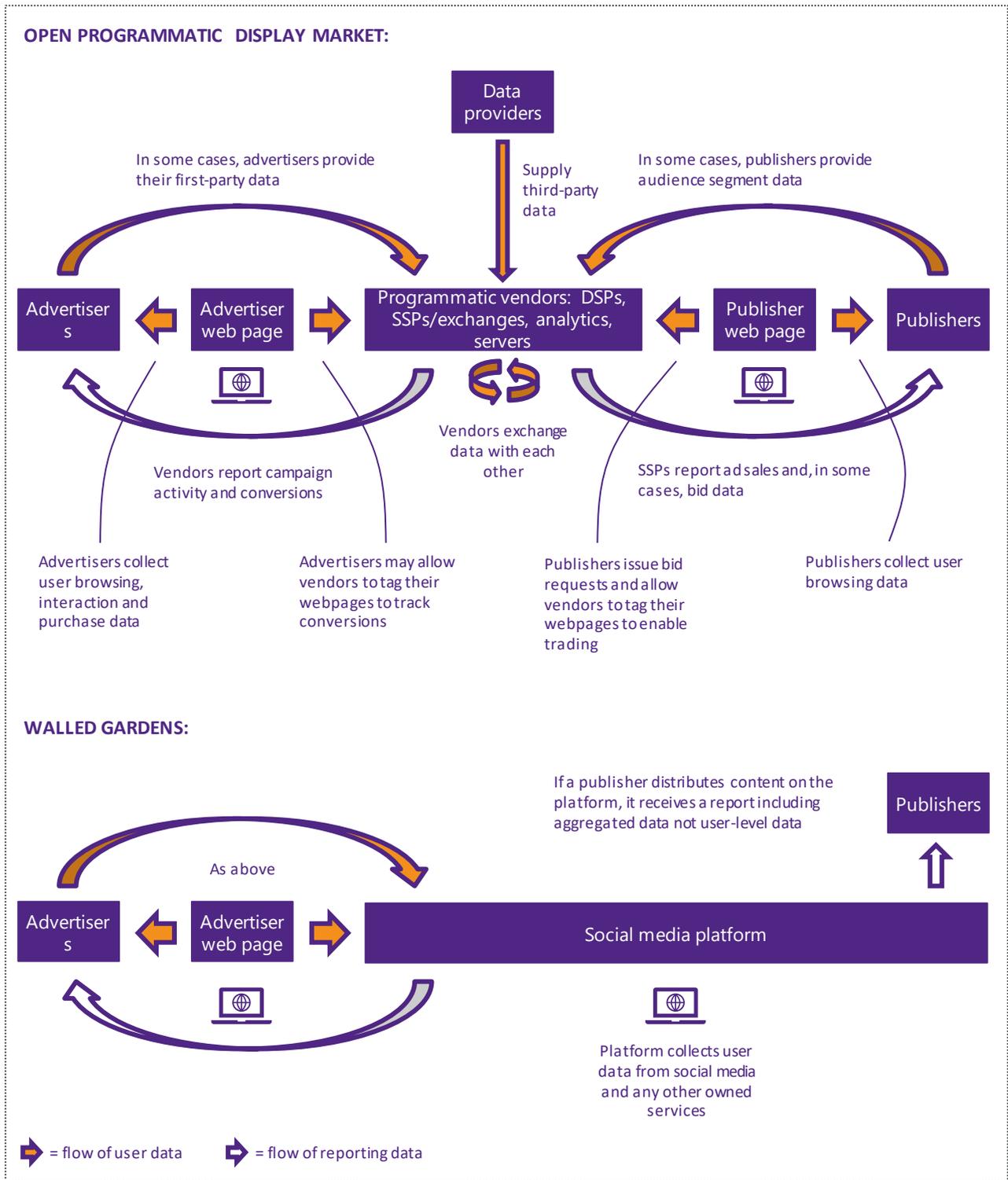
The online advertising market is increasingly divided between the “walled gardens” of major internet companies and the fragmented open internet:

- Major US internet companies collect multiple first-party datasets from large numbers of logged-in users. They operate data “walled gardens” - generally, they do not share data with third-parties, but do allow partners to import data onto their platforms for use in targeting or to measure attribution. Facebook, Google and Amazon have the important advantage of logged on users on many of their services²⁰. This logon data allows them to identify users, based on registration data, across devices and browsers.
- In the open internet market, data collection and processing are fragmented across multiple different publishers and intermediaries. Developing a joined-up view of consumers across devices and browsers is difficult. Market participants work together to share data - publishers choose to allow third-party ad tech vendors to collect data from their webpages and apps in order to achieve the best price for their inventory. This approach leads to data leakage – buyers able to see certain publisher user data (pseudonymous) and develop a view of these users.

These two areas intersect where major US internet companies leverage their “walled garden” data in the open internet advertising market on owned and operated DSPs such as DV360 (Google) and Amazon DSP.

²⁰ Facebook and Instagram users are logged on. Logon is required on some Google services, such as Gmail, but not YouTube or search.

Figure 7: Data flows by scenario – highly simplified and generalised



Importantly, the quality of data in programmatic advertising is variable. Deterministic data, such as data provided by consumers on forms, may be in error if family members share devices and logons, or consumers lie when they fill in forms. Probabilistic data, inferred from user behaviour, is inherently error prone as it may be based on incorrect assumptions or inferences. All data may quickly become out of date. Consequently, audience

targeting is imperfect. In the UK in 2016, although 91% of digital advertising targeted at over 18-year-olds reached this audience, only 50% of advertising aimed at over 18-year-old females was on target²¹.

The use of data in advertising has been affected by regulatory developments. The implementation of the General Data Protection Regulation (GDPR) has decreased availability of third-party data in the open internet market and led Google and Facebook to stop third-party access to user IDs. The proposed ePrivacy Regulation would require the consent of users for the lawful use of cookies and other advertising identifiers²². IAB Europe claims that the proposed Regulation would “*undeniably damage the advertising business model – without achieving any real benefits for users from a privacy and data protection point of view.*”²³

Ad flows and control points

After an ad is sold, the ad creative (the content of the ad) flows from the advertiser/agency ad server to the user. The online advertising industry has put in place numerous policies and procedures to quality assure ads and publishers involved in these flows, and to prevent fraud. The first line of defence is generally automated, given the need to check large volumes of ads and publishers – especially in the case of self-service platforms that enable small-scale advertisers and publishers to participate. Despite these measures, some bad ads are placed in publisher content, some ads are placed against bad content, and fraud takes place (see below).

In the open programmatic display market, some DSPs and SSPs use automated screening – computerised scans of ad content – to identify ads suspected of infringing their policies, then perform manual checks on ads flagged up by this system. Similarly, SSPs generally screen websites for compliance with content policies, which generally ban sites featuring content such as copyright infringement and violence. DSPs and SSPs also provide advertisers and publishers with filters to block higher-risk publishers and buyer respectively.

Social media and search platforms generally conduct checks on ads and advertisers involving automated screens and human escalation. Facebook advertisers need to have a Facebook account in order to place ads. Facebook has advertising policies²⁴ that prohibit certain content (e.g. illegal products, discriminatory practices, tobacco products, and weapons), restrict certain content (e.g. alcohol, dating, gambling) and restrict targeting practices (e.g. discrimination against users, predatory advertising). Facebook uses automated screening involving artificial intelligence to check compliance with these policies, with escalation to human review. Google Ads takes a similar approach. Snapchat conducts manual checks on ads before these ads are served.

The challenge for Facebook and YouTube is the large volume of user-generated content that advertising might be placed against or adjacent to. Facebook has Community Standards setting out what is and is not allowed on Facebook, covering areas such as violence and criminal behaviour, safety, objectionable content, integrity and authenticity and respecting intellectual property. Facebook uses technology and manual review to enforce these standards.

²¹ The Nielsen Company. (2017). *Nielsen Digital Ad Ratings: Benchmarks and findings through 2H 2016, Europe*. Available at: <https://www.nielsen.com/content/dam/niensenglobal/eu/docs/reports/Nielsen-Digital-Ad-Ratings-Benchmarks-and-Findings-Report.pdf> [Accessed on 18 Nov 2018]

²² Such as the such as the IDFA and AAID identifiers used on Apple and Android devices respectively.

²³ IAB Europe (2017). *Proposed ePrivacy Regulation Fails to Improve Cookie Rules*. Press release, 10 Jan 2017. Available at: <https://www.iabeurope.eu/policy/press-release-proposed-eprivacy-regulation-fails-to-improve-cookie-rules/> [Accessed on 14 Dec 2018]

²⁴ <https://www.facebook.com/policies/ads>

Assessment of potential harms

The growth and complexity of the online advertising market has generated policy and regulatory debate in the UK and overseas. This debate has included consideration of a number of potential harms to consumers, firms and wider society that could arise as a result of the structure and operation of the sector.

The potential harms can be thought of in terms of three broad categories:

- **Individual harms**, referring to potential impacts on individual firms and consumers;
- **Societal harms**, referring to practices which may be detrimental to society as a whole; and
- **Economic harms**, referring to potential harms that may arise from lack of competition or inefficiencies within the sector.

These harms are discussed in greater detail below.

Individual harms

Digital advertising fraud refers to a range of practices used to misrepresent advertising impressions, clicks or conversions in order to generate revenue. Ad fraud is most prevalent in programmatic display advertising, and in particular programmatic indirect display advertising - this route to market offers a number of ways for nefarious actors to enter the ecosystem.

By nature, the extent of ad fraud is hard to measure. As a result, estimates of fraud rates/costs vary widely. The cybersecurity firm White Ops has estimated that, in 2016/17, fraud losses amounted to 9% of desktop display spending. Applying these proportions to the UK non-social display market implies that ad fraud could amount to losses of around £174m per annum.²⁵

Brand risk is when a legitimate display ad appears next to inappropriate content. Categories of content that are generally regarded as unsafe include adult content, hate speech, terrorism, digital piracy, military conflict, illegal drugs, crime and fake news. However, brand safety is subjective, with many brands having their own requirements and expressing varying degrees of caution.

Integral AdScience estimates 4.5% of desktop display impressions are "risky", but vast majority of these are of 'moderate/mild' risk – the proportion of "very high" risk impressions (illegal or graphic content) is low (<0.1%). There is also some evidence to suggest that the brand safety risk has been declining in the UK. However, unsafe placement still happens – most commonly through the longer tail of exchanges and publishers and on sites hosting user-generated content.

Inappropriate advertising includes display advertising creative that is offensive, explicit, discriminatory or in poor taste, advertising that contains malware, or legitimate advertising for age-restricted products that is displayed to children. According to industry stakeholders we interviewed, the problem is relatively minor, with the overwhelming majority of ads served being innocuous, though it is not possible to ascertain how much inappropriate advertising goes unreported.

Although the advertising creative potentially goes through checks and verification at several points along the value chain, an inappropriate creative can still slip through the system. This can happen because creative is

²⁵ This figure is based on estimates of the size of the non-social display and video markets, excluding direct-sold broadcaster video-on-demand

miscategorised, or because a creative that has passed verification checks and procedures is 'switched out' by a malicious actor at the last moment.

Advertising may be targeted at the wrong audience as a result of misreported or erroneous audience data. There is a tension between being able to accurately target ads and user privacy regulation, which makes assembling an accurate dataset difficult for many non-integrated players. This is a particular challenge on social media and content platforms, which are heavily used by under 16s who may misreport their age.

Societal harms

Online advertising may provide **financial support for publishers of offensive or harmful content**, by providing such publishers an opportunity to monetise that content. The proceeds may be used to produce more content, or to fund illegal or terrorist activity.

The most prominent path to the monetisation of harmful content is via YouTube. While there are a few known cases of terrorists and producers of offensive content making money from YouTube videos, the revenue actually generated is likely to have been small: YouTube has claimed that pay-outs to such extremists were in the "tens of pounds".

Harmful content may also be monetised by plugging a blog or website into Google AdSense, or is via the 'long tail' of programmatic ad exchanges. However, the revenue generated this way – for example, for a fringe white nationalist blog – is likely to be very small.

Discrimination in online advertising can occur when targeting data are used – whether by design or inadvertently – to discriminate on the basis of age, ethnicity or gender (for example, by sending better offers to certain groups). While there are a number of prominent and widely-reported examples of discrimination on these bases, it is not possible to gauge the true extent of discrimination.

Part of the challenge is distinguishing legitimate targeting from discrimination. For example, advertisers on Facebook can target on the basis of attributes that are not of themselves discriminatory, but can in conjunction be used for discriminatory targeting. Automated tools may also lead to inadvertent discrimination, for example automated tools that segment audiences.

Non-transparent political advertising may be used by anonymous actors to influence elections and referendums in the UK. In the UK, political advertising on non-broadcast media is not regulated outside of election periods; during election periods, UK electoral law sets limits on the amount that can be spent on campaign activity – including online advertising.

The Electoral Commission highlighted a number of concerns with the current framework, including concerns over the opacity of funding sources for digital campaigns (including funding from outside the UK), the transparency of the campaigns themselves (including who was targeted and how much was spent), and concerns over the truthfulness of digital campaign material.

Economic harms

In the long run, a lack of effective competition in the market could lead to a number of negative outcomes – including higher prices for advertisers, more (or more intrusive) ads for consumers than would be seen under a competitive market, and anti-competitive practices.

A number of US-based internet companies occupy prominent positions in different parts of the online advertising market, and in associated digital user services markets. In particular, Google has market leadership in search advertising, programmatic display intermediaries and programmatic display ad server technology, while Facebook has a majority share of social display and is the leader in overall display.

In addition, there are a number of market features that may present barriers to market entry and expansion to competitors. These include economies of scale and scope, network effects in display intermediation and digital user services markets, vertical integration and access to data to enhance the targeting and measurement of advertising campaigns. Together these features may impede the emergence of greater competition within the online advertising market.

As a consequence of their position in the market, and the barriers to entry, Google and Facebook may have the ability to act in an anti-competitive way. However, given that parts of the market are opaque - such as how algorithms work - it is not clear whether such practices are occurring. Interviewees noted various areas for potential concern in the industry, some of which are listed below.

- **Product bundling and exclusivity.** Certain products are offered on an exclusive basis – for example, display inventory on Amazon’s ‘owned and operated’ websites (such as IMDb) is only available through Amazon’s DSP.
- **‘Walled Gardens’.** Some stakeholders indicated that it was not easy or possible to export user ID data collected during advertising campaigns from the platforms (GDPR has also made platforms more protective of their data).
- **Lack of transparency in programmatic display.** Stakeholders highlighted a general perception of a lack of transparency in the market for programmatic display, such as the algorithms used to facilitate trading. Stakeholders felt that it was not always clear how measurement and attribution is handled on these platforms.
- **Differential treatment.** Some stakeholders suggested that there may be differential treatment of different display advertising inventory by integrated firms. Such firms may be in a position to give priority to their own display inventory over that of others.
- **Leveraging.** Various stakeholders noted that the strong positions of online platforms at different levels of the online advertising market could be ‘leveraged’ into other parts of the market. Some stakeholders suggested that online platforms were able, to a large extent, to set the ‘rules of the game’ in the market.
- **Engagement with industry initiatives.** Stakeholders noted that some of the larger players in the market do not always adopt industry-led efforts to facilitate standardisation.
- **Control of web browsers.** Some stakeholders expressed concerns that operators of web browsers could unilaterally change adblocking and data-collection settings (or default settings) on their browsers. These concerns were focussed in particular on Google’s Chrome browser, which, in the UK, has an estimated market share of 49% across all platforms and 66% on desktop.

1 Introduction

1.1 Terms of reference

The Department of Digital, Culture, Media & Sport (DCMS) commissioned this research to feed into two areas of work:

1. The consideration of the broad principles that govern online advertising, as part of the Government's Digital Charter work programme which aims to make the UK the safest place to be online and the best place to start and grow a digital business.
2. How the online advertising sector impacts the sustainability of the UK press sector, in relation to the Cairncross Review.

The objective of the research is to develop an independent analysis reporting on:

- The structure of the online advertising sector.
- The movement of data, content and money through the online advertising value chain.
- Potential harms around online advertising.

The scope of work includes all forms of online advertising, with a focus the online advertising supply chain that the press sector participates.

1.2 Methodology

The project involved a short review of publicly available information about the online advertising market, such as industry reports, trade publications, company websites and annual reports. In November and December 2018, we conducted a programme of 24 interviews with senior managers across publishers, major US internet companies, programmatic advertising intermediaries, media agencies, advertisers and industry bodies. Interviews were conducted off the record and, when referring to interviews in this report, we present aggregated and anonymised findings.

1.3 Caveats

We present a snapshot of the market at the time of writing. The online advertising market is characterised by a fast pace of change in terms of market structure, practices and competitive dynamics and is likely to evolve significantly over the next 6 to 12 months.

There is limited available data about the UK online advertising market. The Internet Advertising Bureau gathers data about total advertising expenditure in certain categories, but there are no publicly available sources of data about market shares or the distribution of revenues between participants in the supply chain. In some instances, we have made highly indicative estimates of market share and money flows based on available data and feedback from interviewees.

We present a broad overview of the market and zoom in on a small number of issues relevant to publishers. The online advertising market is highly complex, and practices and business models differ between competitors. Consequently, we have had to generalise and simplify.

1.4 Press publishers

We use the term publisher broadly to refer to any online operator that attracts an audience to content it provides. Press publisher online services are a subset of this category. In the report, we have signposted where conclusions refer to press publishers online, all online publishers or other online advertising providers such as search or social media platforms.

1.5 Structure of this report

Sections 2 to 5 define online advertising, size the market and describe the value chain and market dynamics – corresponding to Part A of the DCMS scope of requirement.

Section 6 describes how money, data and content flow through the value chain in certain scenarios – corresponding to Part B of the DCMS scope of requirement.

In Section 7 we describe potential harms that could arise as a result of the structure and operation of the online advertising market.

2 Taxonomy of online advertising

Online advertising is the use of online services to deliver marketing messages. The first internet banner advertising appeared in 1993²⁶ and the first sponsored search auction launched in 1998²⁷. In the subsequent years, the internet advertising industry has innovated rapidly, proliferating a wide range of internet advertising formats, targeting techniques and sales and trading methods.

2.1 Online advertising formats

There are three main types of online advertising in terms of the form and function of the advertising and how it appears to consumers: search, display and classifieds.

Figure 2.1: Taxonomy of internet advertising formats²⁸

Category		Description	Examples
Search		Paid-for listing in search results, such as sponsored or promoted listings	Sponsored links on Google.co.uk web search results
Display ²⁹	Banner	Advertising shown in standard display units on webpages or in apps - ad content types include images and animations	Banner advertising appearing at the top of pages on FT.com
	Native	Advertising integrated into the surrounding content, predominantly in-feed advertising such as promoted posts in social feeds or paid-for recommendations on webpages	Sponsored product links appearing on an Instagram feed Facebook carousel image ads 'Promoted links from around the web recommended by Outbrain' appearing below articles on The Guardian app
	Sponsored content	Advertiser-sponsored content on a webpage or app such as in ad-features/advertorials	Sponsored articles on BuzzFeed.com
	Out-stream video	Video advertising shown in non-video content	Video advertising appearing in ad units within text articles on Mirror.co.uk
	In-stream video	Video advertising shown before, during or after video content – also known as pre- and post-roll video	30-second video ads shown within programming on ITV Player 6-second bumper video ads shown before YouTube videos
Classifieds		Paid listings such as recruitment, property, cars and services	Paid-for listings on Yell.com and Autotrader.com

²⁶ Oberoi, A. (2013). *The History of Online Advertising*. Available at: <https://www.adpushup.com/blog/the-history-of-online-advertising/> [Accessed 17 Nov 2018]

²⁷ Jansen, J.B. (2008). Sponsored search: an overview of the concept, history, and technology. *Int. J. Electronic Business*, Vol. 6, No. 2. Available at: https://faculty.ist.psu.edu/jjansen/academic/pubs/jansen_overview_sponsored_search.pdf [Accessed on 15 Nov 2018]

²⁸ Elaborated from a segmentation used by the IAB and PwC to report online advertising expenditure in the UK.

²⁹ Display also includes other, lesser-used display formats, such as tenancies (sponsorship of a website or sections of a website) and interruptive formats.

Other	Audio advertising and lesser-used formats such as solus email, lead generation and mobile SMS/MMS. Emerging online advertising formats, such a virtual reality (VR) and augmented reality (AR).	Audio advertising on Spotify Jaguar Land Rover ad using AR on mobile ads to show users a car overlaid on their surroundings ³⁰
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Affiliate marketing (see Section 2.1.8) is a form of online advertising in which payment is triggered by an outcome, such as a user making a purchase. Affiliate marketing may involve various ad formats and consequently it overlaps with the categories shown in Figure 2.1, above.

The form and function of online advertising differs by device. The Internet Advertising Bureau (IAB) distinguishes between smartphone-only (advertising specifically tailored and served on a smartphone or feature phone device) and desktop/laptop/tablet. For example, banner mobile advertising units are sized smaller than their desktop equivalents.

In addition to online advertising, brands use online platforms for other forms of marketing not generally considered to be online advertising, such as influencer marketing. This involves brands paying social media influencers to mention advertisers' products and services in their social media output (see Section 2.1.9).

Increasingly, trading techniques developed for online advertising are being applied to advertising on other platforms such as television (e.g. dynamic advertising insertion on television sets) and digital out of home (e.g. digital billboards). These developments are not within the scope of this report.

2.1.1 Search advertising

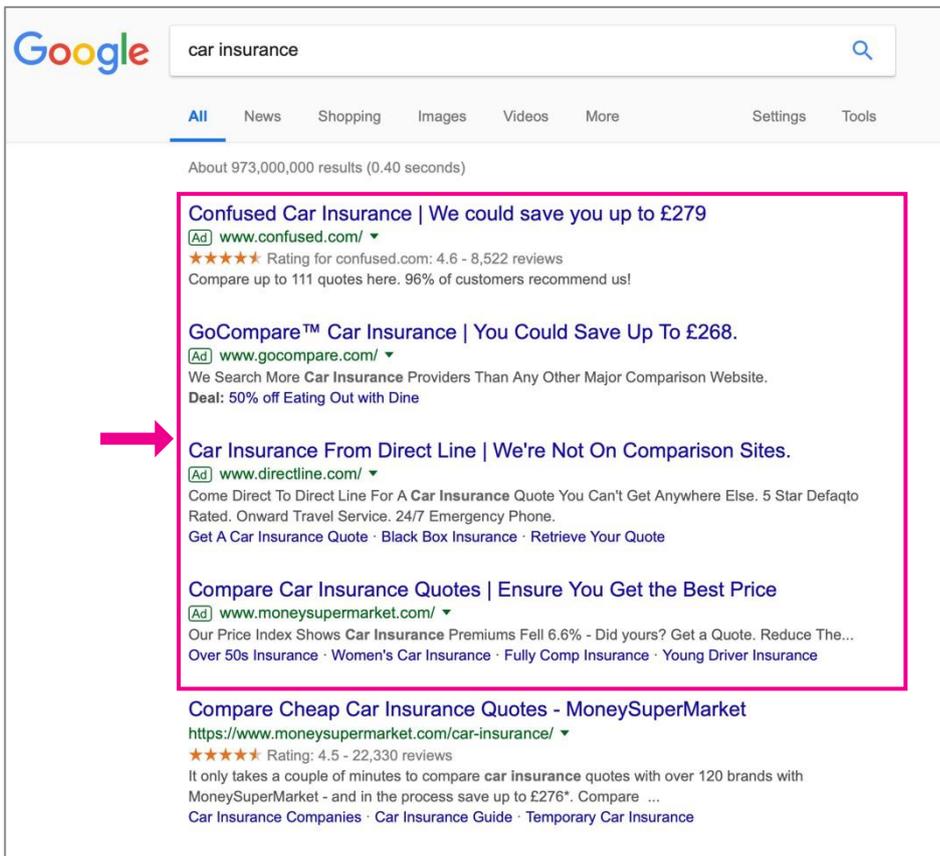
Search advertising includes fees advertisers pay online companies to list and/or link their company site domain name to a specific search word or phrase, including paid search revenues. Search categories include³¹:

- Paid listings – payments made for clicks on text links that appear at the top or side of search results for specific keywords. The more a marketer pays, the higher the position it gets. Marketers only pay when a user clicks on the text link.
- Contextual search – payments made for clicks on text links that appear in an article based on the context of the content, instead of a user-submitted keyword. Payment only occurs when the link is clicked.
- Paid inclusion – payments made to guarantee that a marketer's URL is indexed by a search engine (i.e. payment is made regardless of whether the link is clicked or not).
- Site optimization – payments made to optimize a site in order to improve the site's ranking in search engine results pages (SERPs). (For example, site owner pays a company to tweak the site architecture and code, so that search engine algorithms will better index each page of the site).

³⁰ Available at: <https://www.campaignlive.co.uk/article/new-banner-ad-jaguar-land-rover-lets-test-drive-car-phone/1435358> [Accessed on 8 Dec 2018]

³¹ PwC. (2018). *IAB internet advertising revenue report*. Available at: https://www.iab.com/wp-content/uploads/2018/05/IAB-2017-Full-Year-Internet-Advertising-Revenue-Report.REV_.pdf [Accessed on 15 Nov 2017]

Figure 2.2: Sponsored links in search results³²



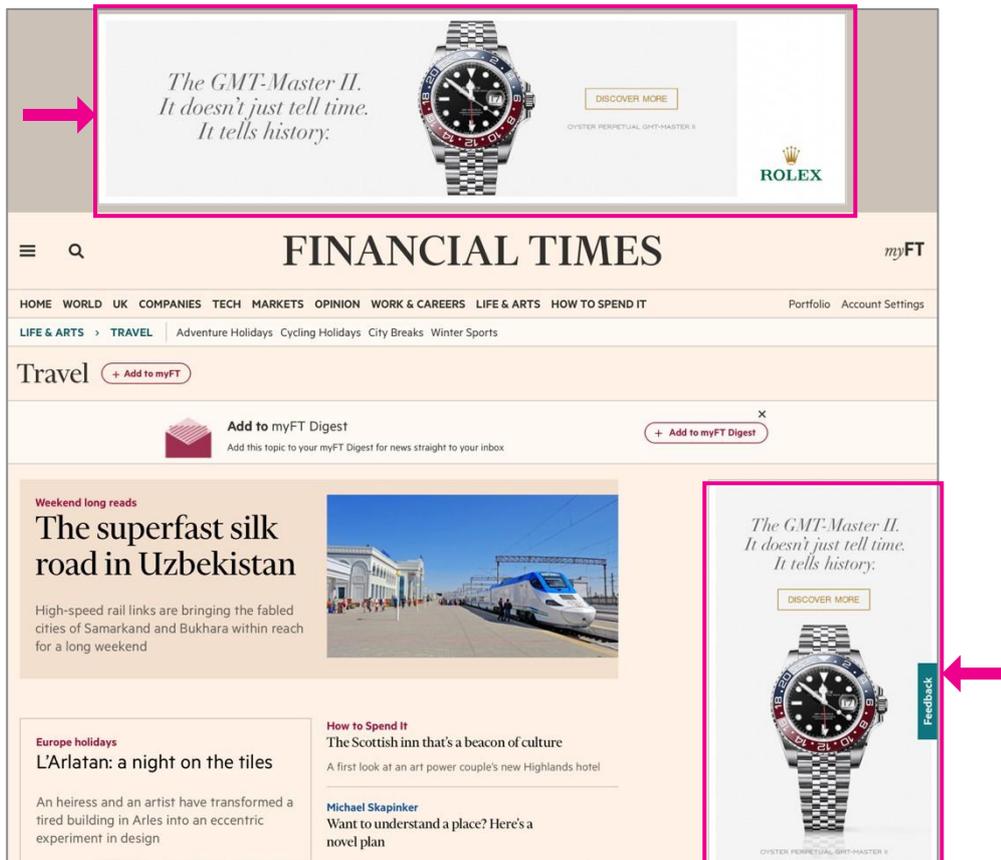
2.1.2 Banner display advertising

Banner display includes a range of advertising content types shown within defined ad units on web pages or on mobile apps. The IAB has defined 22 standard ad units of varying dimensions, such as horizontal billboard, vertical skyscraper, small tiles, full page landscape and feature phone banners³³. The content placed in these units may include static images, animations or video (classified as out-stream video, below). The IAB has issued guidelines which limit the use of ads that expand beyond their original size and recommends the inclusion of close buttons on such ads.

³² Google. (2018). Available at: <https://www.google.co.uk/> [Accessed on 17 Nov 2018]

³³ IAB Technology Laboratory. (2017). *IAB New Ad Portfolio Release Notes*. Available at: https://iabcanada.com/content/uploads/2017/06/IABNewAdPortfolio_Release_Notes_2017-07.pdf [Accessed on 17 Nov 2017]

Figure 2.3: Banner advertising on FT.com³⁴



2.1.3 Native display advertising

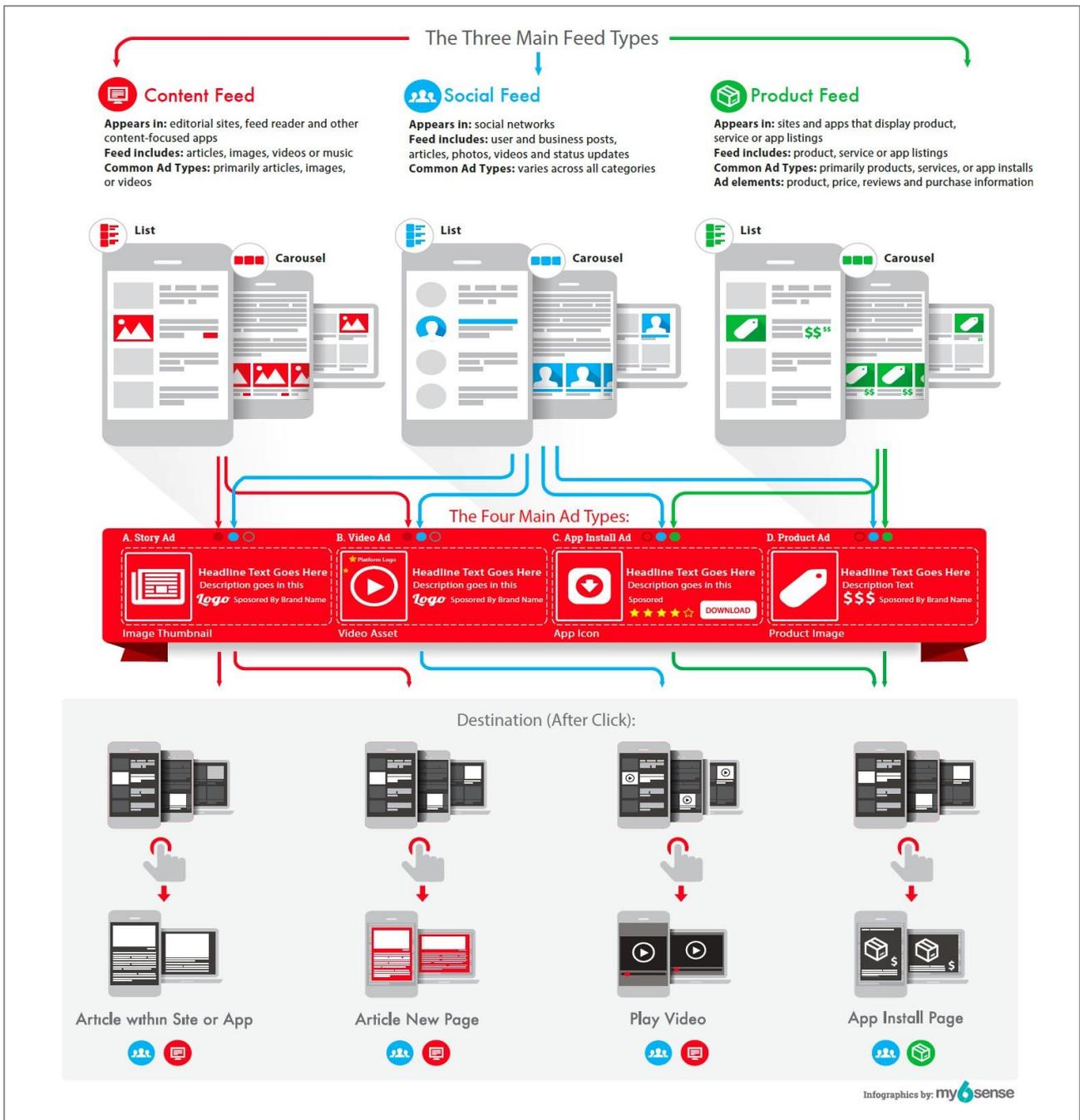
Native advertising is integrated into the surrounding content in a non-interruptive way, following the form and function of the user experience in which it is placed. In some cases, native advertising formats are specific to the website or app in which the advertising appears. In-feed advertising – placing advertising within content, social or product feeds – accounted for 92% of UK native advertising expenditure in 2017³⁵. In-feed includes Facebook advertising formats such as images and carousels (collections of 2 or more scrollable images). The rest of the market is native distribution, which refers to content recommendations that appear in certain publisher³⁶ pages.

³⁴ Financial Times. (2018). Available at: <https://www.ft.com/> [Accessed on 17 Nov 2018]

³⁵ IAB. (2017). *Digital Adspend- IAB / PwC Digital Adspend 2017*. Available at: <https://www.iabuk.com/research/digital-adspend> [Accessed on 16 Nov 2017]

³⁶ Throughout the report we will use the terms "publisher" and "media owner" interchangeably to denote the owner of online content or application within which advertising can be displayed.

Figure 2.4: Types of in-feed ad units³⁷



³⁷ IAB. (2015). *IAB Deep Dive on In-Feed Ad Units*. Available at: https://www.iab.com/wp-content/uploads/2015/07/IAB_Deep_Dive_on_InFeed_Ad_Units.pdf [Accessed on 17 November 2017]

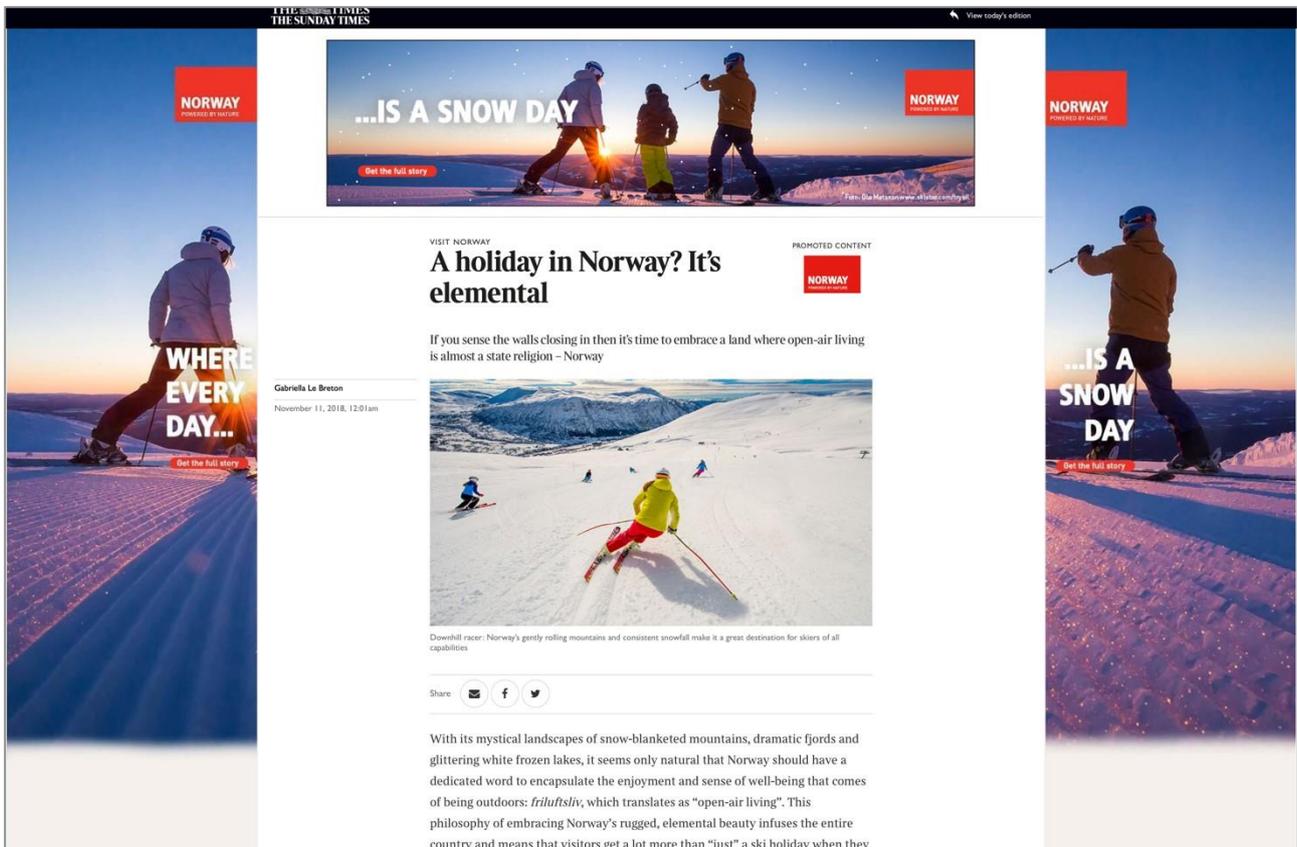
Figure 2.5: In-feed advertising on the Facebook app³⁸

2.1.4 Sponsored content

Sponsorship involves an advertiser paying for content which is distributed on a publisher website or app, includes advertiser branding and is generally labelled as promoted content, advertorial or advertising. The advertiser or the publisher may have editorial control over the content.

³⁸ Facebook mobile app [Accessed on 17th Nov 2018]

Figure 2.6: Promoted content on Thetimes.co.uk website³⁹

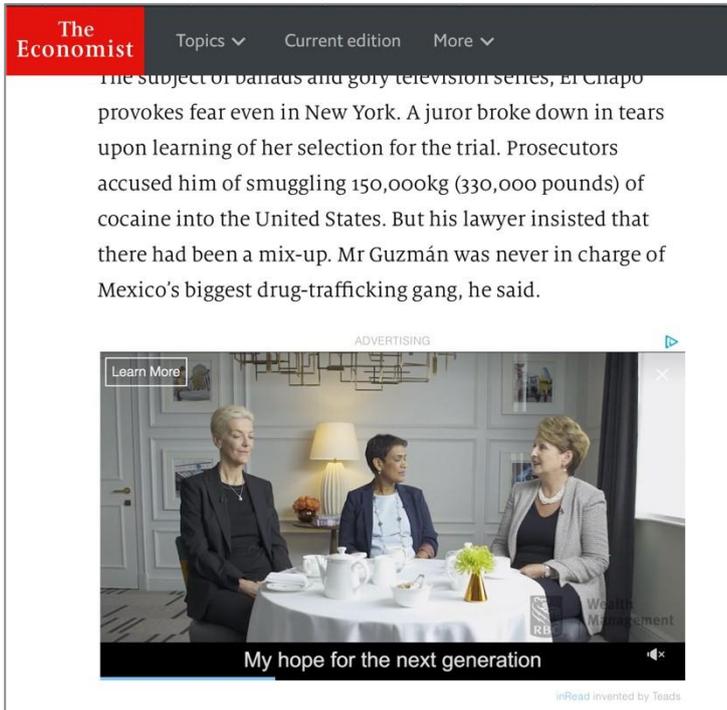


2.1.5 Out-stream video advertising

Out-stream video is the insertion of video advertising into standard units on web pages or in apps. The video advertising appears within the web page or app, not within video content.

³⁹ The Times. (2018.) Available at: <https://www.thetimes.co.uk/> [Accessed on 17th Nov 2018]

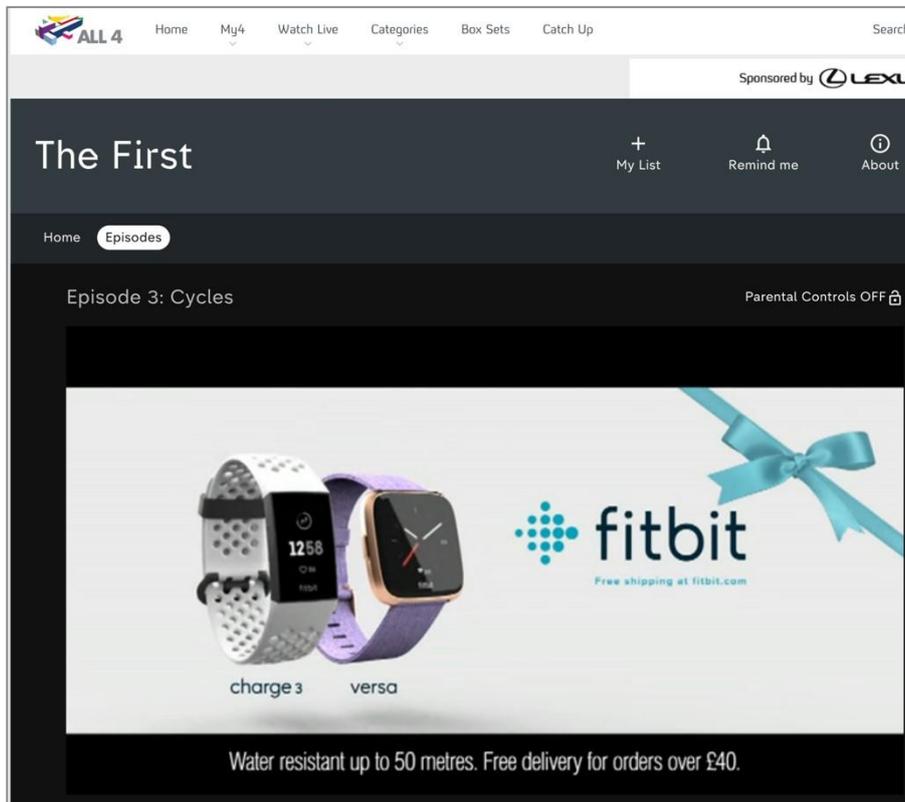
Figure 2.7: Out-stream video advertising on the Economist.com ⁴⁰



2.1.6 In-stream video advertising

In-stream video advertising is the online equivalent of television advertising, including video advertising that appears before, during or after online video content in a video player. In-stream video is also referred to as pre-roll, mid-roll and post-roll video advertising. YouTube advertising falls within this category, including video advertising preceding or during a YouTube video and YouTube display ads that are overlaid on video content.

⁴⁰ The Economist. (2018). Available at: <https://www.economist.com/> [Accessed on 17 Nov 2018]

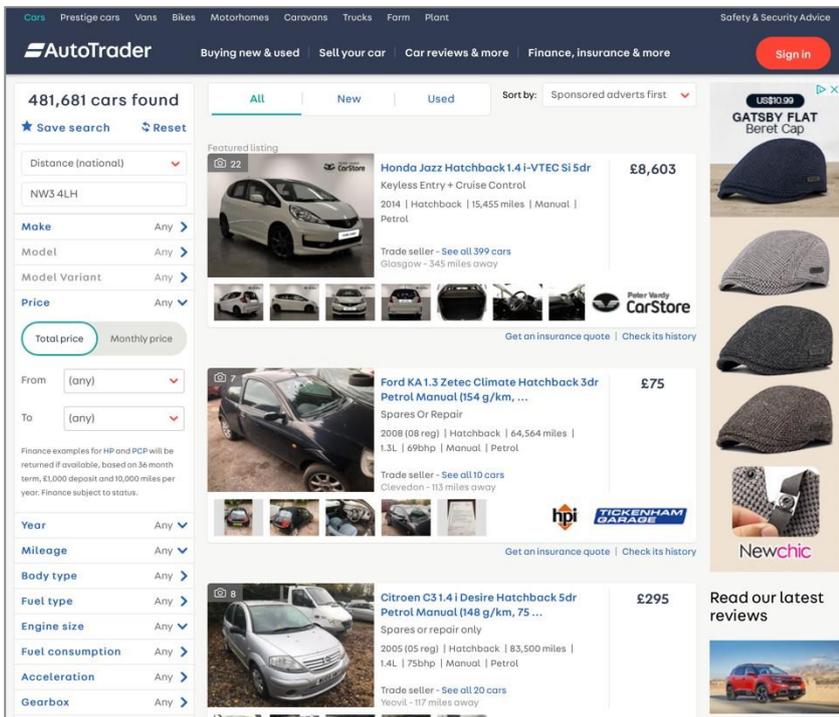
Figure 2.8: In-stream video advertising on All4 programming⁴¹

2.1.7 Classified advertising

Classifieds involve advertisers paying online companies to list specific products or services, including recruitment, property, cars, auction-based listings and yellow pages. In many cases, dedicated classifieds sites serve particular vertical markets, such as Autotrader.co.uk (cars) and Zoopla.co.uk (property).

⁴¹ Channel 4. (2018). Available at: <https://www.channel4.com/> [Accessed on 17th Nov 2018]

Figure 2.9: Car listings on Autotrader.co.uk⁴²



2.1.8 Affiliate marketing

Affiliate marketing is a form of online advertising in which payment is triggered by an outcome, such as a user making a purchase. In the affiliate model, users will typically click an advertisement and be re-directed to the advertiser’s website to complete the transaction, following which a fee is paid to the publisher once the transaction is completed. Affiliate marketing is most prevalent on coupon and rebate websites, cashback websites, comparison shopping websites and content websites. Publishers may use affiliate marketing models such as linking to commerce sites from articles (see example, below).

⁴² Autotrader. (2018). Available at: <https://www.autotrader.co.uk/> [Accessed on 17 Nov 2018]

Figure 2.10: Links to commerce sites from London Evening Standard Homes and Property⁴³

With Christmas fast approaching, even those with the best intentions may find themselves running out of time.

If you're looking for some last-minute gift inspiration, that looks like you've put in more thought than you've actually had time for, look no further.

A timeless gift, Waterford crystal **balloon glasses** are ideal for any gin connoisseur. Designed with advice from tasting experts, the balloon shape enhances the aromas of your favourite, festive apéritif .

One for the coffee obsessive on your gift list this year, Smeg's new **drip filter machine** comes in the brand's instantly recognisable pastel colourways.



Off the wall luxe gift ideas: Laura Spring's wall hangings cost £135 each, order by December 19

Laura Spring's printed **wall hangings** make a stylish, vibrant addition to any room and are a perfect one-off gift for interiors fans. Order by December 19 for a pre-Christmas delivery.



London house prices drop £11k in a month amid Brexit uncertainty



Inside the quirkiest and most unusual homes that went on sale in 2018



London's outer boroughs see biggest house price falls since 2010



UK house prices fall £10k in two months in biggest drop since 2012



Lucy Watson's festive tips on how to have a vegan Christmas

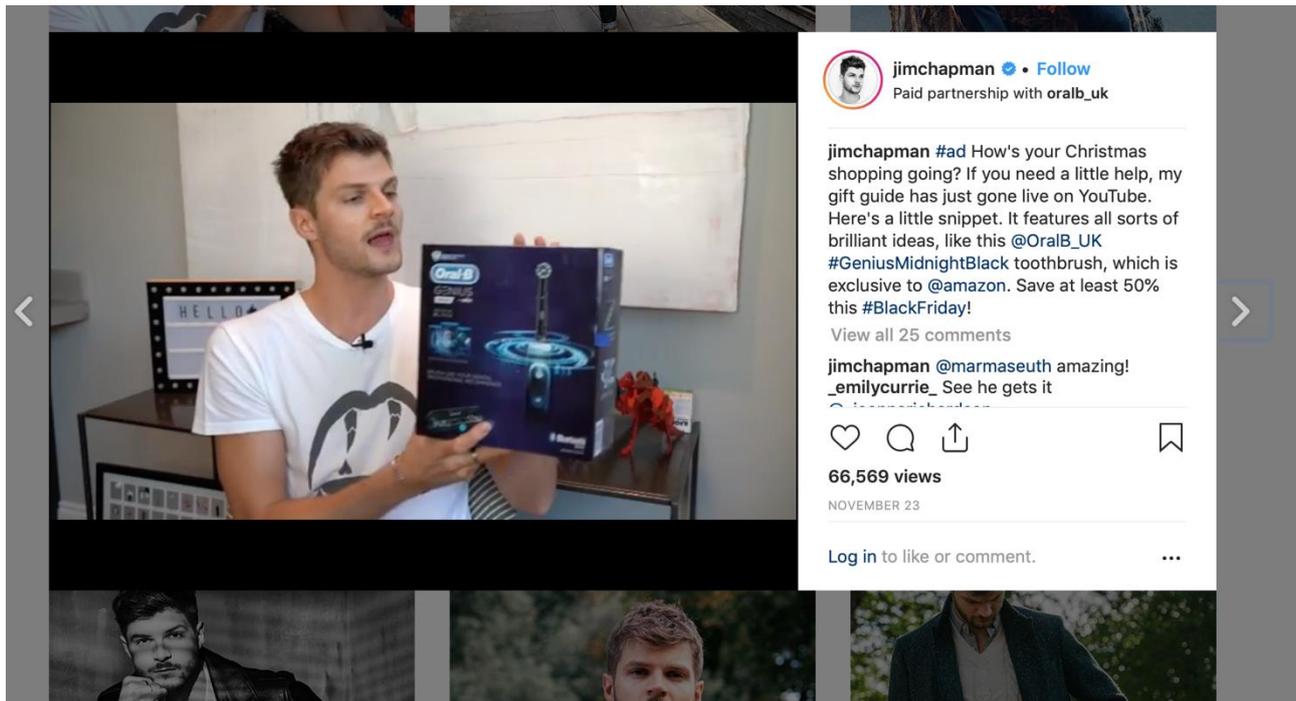


Palace Wharf

2.1.9 Influencer marketing

Influencer marketing involves celebrities, social media personalities, professional bloggers or other influencers promoting brands to their followers on social media platforms such as YouTube, Instagram and Twitter in return for payment or other incentives. Influencer marketing content includes brand-created content that influencers share with their followers or influencer generated content in which a brand is mentioned.

⁴³ London Evening Standard Homes and Property. (2018). Available at: <https://www.homesandproperty.co.uk/> [Accessed on 18 Dec 2018]

Figure 2.11: Sponsored Instagram video posted by influencer Jim Chapman⁴⁴

2.2 Targeting of online advertising

Online display advertising is often targeted to reach the right people, at the right time in the right context in order to achieve an advertiser's objectives. The main types of targeting used in online advertising include:

- Contextual – advertising is shown in a relevant context, targeted based on content attributes such as keywords or topics.
- Demographic – targeting is done on the basis of demographic information of the user such as age, gender or location which a service provider may know in the case of logged-in users.
- Behavioural – advertising is target to users based on attributes, such as interests, inferred from their previous web browsing activity or other data.
- Retargeting – recent visitors to a website are served advertising from that website when, after clicking away from the website, they browse other websites. Retargeting aims to recapture interest in products or services, such as after a consumer leaves an ecommerce site without completing a transaction.
- Personalisation – at its limit, targeting is used to personalise advertising creative (the content of the advertisement) to the individual receiving the ad. For example, product images in a banner ad may be tailored to the match the interests of the user or, in the case of retargeting, their recent online browsing.

Increasingly, advertisers are creating profiles of their customers encompassing multiple data points, such as demographics and behaviour. They then seek to target "lookalike" audiences online.

⁴⁴ Instagram. (2018). Available at: <https://www.instagram.com/jimchapman/> [Accessed on 18 Dec 2018]

2.3 Future developments

The online advertising market is evolving fast. Emerging online advertising formats include:

- Augmented reality (AR) and virtual reality (VR). Advertisers are already using AR formats, such as sponsored camera filters on the Snap mobile app, and 360-degree VR ad formats that enable users to explore images or videos. Looking ahead, AR offers opportunities to overlay images of advertiser products and messaging onto mobile camera images - for instance showing items in a room. VR will enable advertisers to offer immersive experiences.
- Dynamic content optimisation. 87% of European marketers claim to use dynamic content optimisation, a technology that creates personalised content in real time based on data about the user⁴⁵. Technology vendors such as Jivox are using artificial intelligence to enable advertisers to produce different ads for each user impression. There is potential for further development of computer-generated personalised ad creative.
- Voice advertising. Voice assistants such as Amazon Alexa, Apple Siri and Google Assistant are integrated into a wide range of devices, including smart speakers, smartphones, cars, wireless headphones, PCs/laptops, TVs and watches. 10% of UK adults had a smart speaker in Q1 2018⁴⁶. Consumers use voice assistants for a range of tasks and utilities, including search and asking questions. Consequently, voice is likely to account for a large share of searches in future. Major voice assistant competitors have not yet introduced paid search advertising, but it is likely that they will seek to monetise growing voice search and commerce activity in the future.

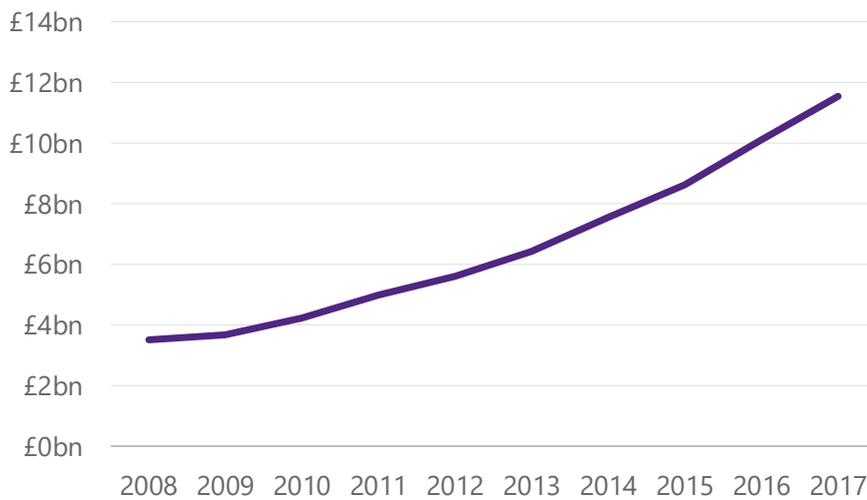
⁴⁵ Sizmek. (2018). *An Insider's Look at Creative Quality, Personalization, and DCO*. Available at: https://info.sizmek.com/rs/303-WWQ-966/images/Sizmek_Marketers_Survey_2018_Creative.pdf

⁴⁶ YouGov (2018). *Smart speaker ownership doubles in six months*. Available at: <https://yougov.co.uk/topics/politics/articles-reports/2018/04/19/smart-speaker-ownership-doubles-six-months>

3 Market size and growth

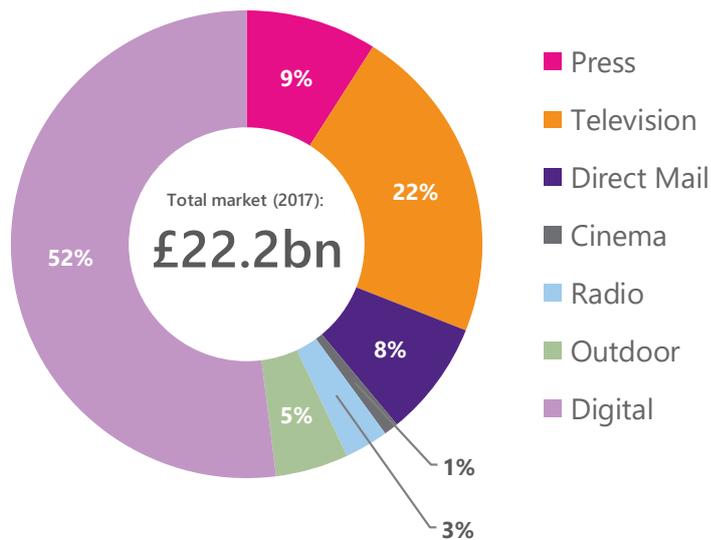
The internet advertising industry has grown very strongly as online media consumption has increased and advertisers have allocated more budget to online. UK internet advertising expenditure increased from £3,508m in 2008 to £11,553m in 2017, a compound annual growth rate of 14%. In 2017, internet advertising overtook all other forms of advertising (television, press, radio, cinema and outdoor) combined, to reach 52% share of total advertising spending⁴⁷.

Figure 3.1: Development of UK digital advertising spending⁴⁸



Source: IAB UK / PwC Digital Adspend Study

Figure 3.2: Share of total UK advertising spending by medium, 2017



Source: IAB UK / PwC Digital Adspend Study

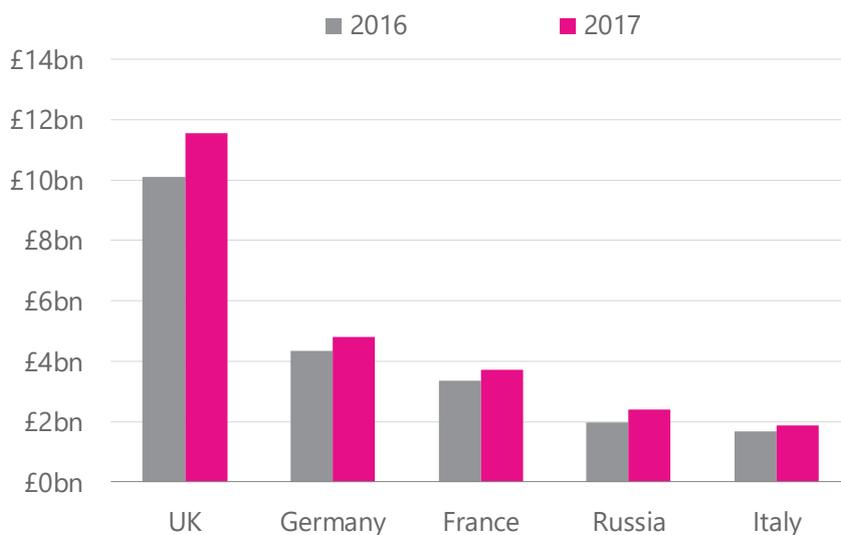
⁴⁷ IAB. (2017). *Digital Adspend- IAB / PwC Digital Adspend Study*. Available at: <https://www.iabuk.com/adspend/full-year-2017-digital-adspend-results>

⁴⁸ Net of agency commission.

Online influencer marketing, not generally considered to be advertising, is not included in this data. There is very limited data about online influencer marketing expenditure, which one estimate indicates is equivalent to 1% to 2% of total online advertising expenditure⁴⁹.

By international standards, the UK has an especially well-developed online advertising industry. In 2017, UK online advertising spending was more than the next three European markets (Germany, France and Russia) put together. Globally, only the USA (£69.5bn digital ad spend in 2017⁵⁰) and China (£66.7bn forecast ad spend in 2017⁵¹) are larger markets.

Figure 3.3: Digital advertising spend – top 5 European markets



Source: IAB Europe / IHS Markit (converted to £)

The UK is home to a thriving online advertising industry, including local offices of major US internet businesses, leading global advertising agencies, local ad-tech businesses and start-ups.

Paid for search is the largest category of online advertising, accounting for 50% of the UK online advertising market in 2017, compared to 36% for display, 13% for classifieds and 1% other formats. Search and display advertising expenditure is fast-growing, whilst expenditure on classifieds was broadly flat year-on-year⁵².

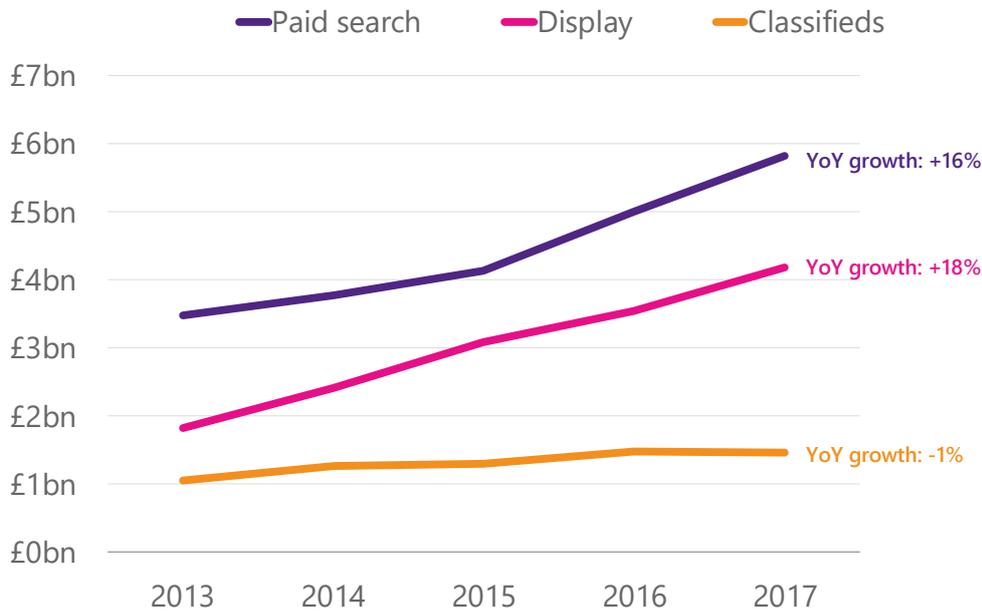
⁴⁹ Mediakix estimate that global online influencer spend was \$2.4bn to \$4.4bn in 2017. <http://mediakix.com/2018/03/influencer-marketing-industry-ad-spend-chart/#gs.LPjLO7g> Magna Global estimate that the total global digital advertising market was worth \$207bn in 2017. <https://www.recode.net/2017/12/4/16733460/2017-digital-ad-spend-advertising-beat-tv>.

⁵⁰ PwC. (2018). *IAB internet advertising revenue report*. Available at: https://www.iab.com/wp-content/uploads/2018/05/IAB-2017-Full-Year-Internet-Advertising-Revenue-Report.REV_.pdf [Accessed on 15 Nov 2017] Exchange rate of \$1=£0.79 applied.

⁵¹ Doland, A. (2017). AdAge: 57% of China's Ad Spend will go to the Internet this year. Available at: <https://adage.com/article/digital/57-china-s-ad-spending-internet-year/309046/> [Accessed on 16 Nov 2018] Exchange rate of \$1=£0.79 applied.

⁵² IAB. (2017). *Digital Adspend- IAB / PwC Digital Adspend 2017*. Available at: <https://www.iabuk.com/research/digital-adspend> [Accessed on 16 Nov 2017]

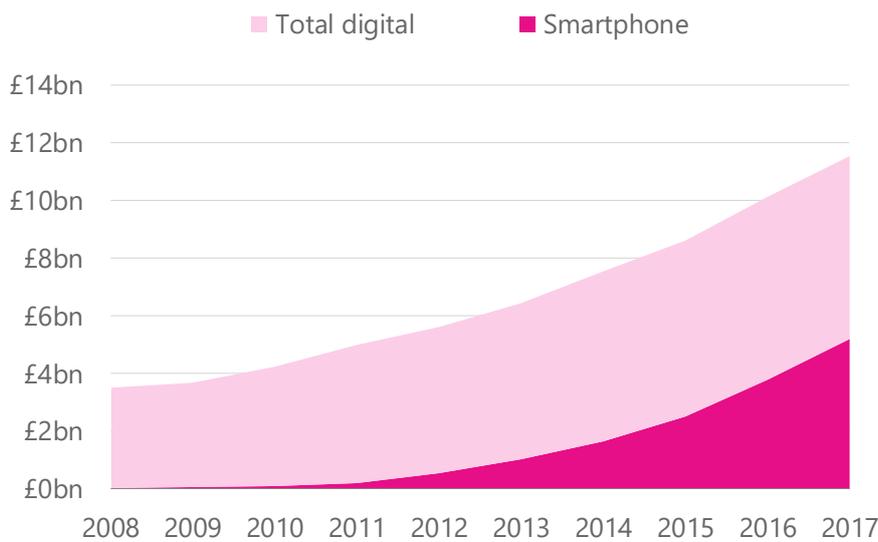
Figure 3.4: UK online search, display and classifieds advertising expenditure, 2013 to 2017⁵³



Source: IAB UK / PwC Digital Adspend Study

Mobile accounts for an increasing share of the online advertising market, with smartphone expenditure accounting for 45% of total online advertising in 2017, compared to 37% in 2016. Smartphone accounted for 61% of total online display advertising and 45% of online search advertising in 2017. The growth in smartphone advertising expenditure is being driven by changes in media consumption, with consumers increasing the time they spend with mobile devices relative to desktop and tablets.

Figure 3.5: UK smartphone advertising expenditure, 2008 to 2017⁵⁴



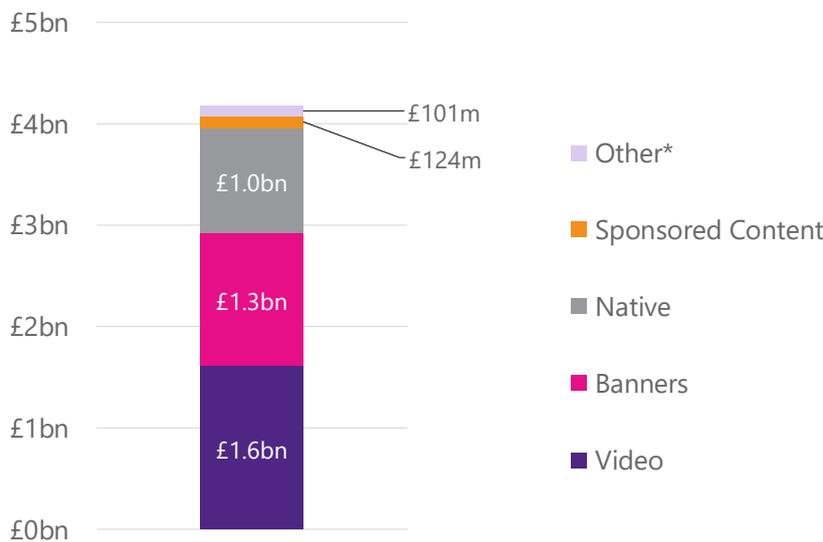
⁵³ IAB. (2017). *Digital Adspend- IAB / PwC Digital Adspend 2017*. Available at: <https://www.iabuk.com/research/digital-adspend> [Accessed on 16 Nov 2017]

⁵⁴ IAB. (2017). *Digital Adspend- IAB / PwC Digital Adspend 2017*. Available at: <https://www.iabuk.com/research/digital-adspend> [Accessed on 16 Nov 2017]

Source: IAB UK / PwC Digital Adspend Study

The online display advertising market breaks down as follows in terms of advertising format.

Figure 3.6: UK online display advertising expenditure, 2017⁵⁵



*Other = lesser used display formats, such as interruptive formats and tenancies (sponsorship of a website or sections of a website). Source: IAB UK / PwC.

Video accounts for the largest share of online display advertising spend, followed by banners and native. Sponsored content and other forms of display advertising are relatively small-scale in terms of advertising expenditure. Video has grown strongly due to increased audiences for broadcaster online video services and YouTube, growth in Facebook video advertising, and strong advertiser demand for video due to the quality of the format.

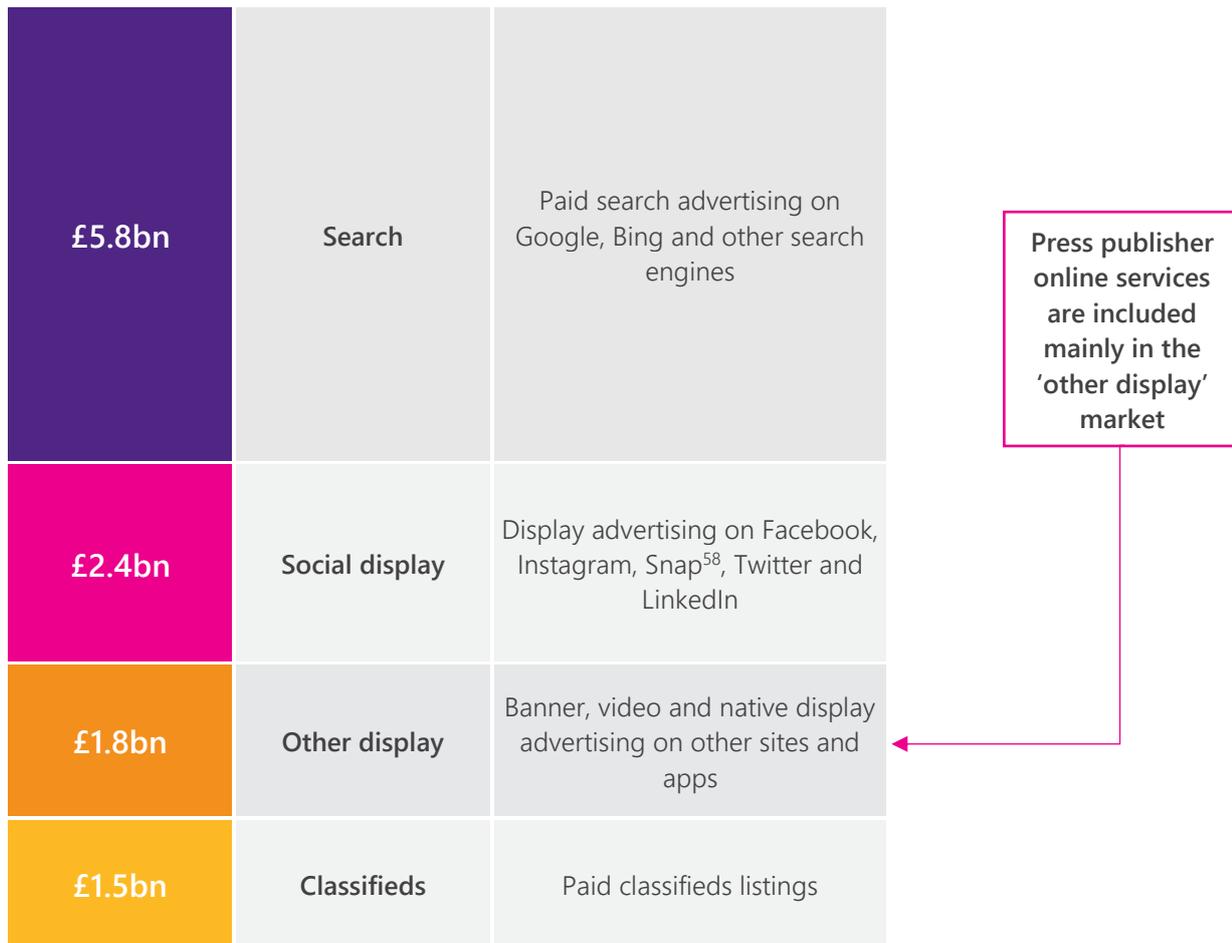
Social media accounts for an increasing share of display advertising. In 2017, 57% of online display advertising expenditure was on social media compared to 49% in 2016⁵⁶. It is likely that the vast majority of this expenditure is captured by Facebook (Facebook and Instagram) and Google (YouTube) – the IAB/PwC data does not break out expenditure between these platforms. Advertisers and their media agencies are allocating increasing expenditure to Facebook and Google due to their ability to offer large yet targeted audiences, underpinned by user data – especially for younger audiences.

In summary, UK online advertising expenditure breaks down into the following main categories.

⁵⁵ IAB. (2017). *Digital Adspend- IAB / PwC Digital Adspend 2017*. Available at: <https://www.iabuk.com/research/digital-adspend> [Accessed on 16 Nov 2017]

⁵⁶ Plum Analysis of IAB / PwC Digital Adspend 2017 data

Figure 3.7: Summary of UK online advertising expenditure by segment, 2017⁵⁷



⁵⁷ IAB. (2017). *Digital Adspend- IAB / PwC Digital Adspend 2017*. Available at: <https://www.iabuk.com/research/digital-adspend> [Accessed on 16 Nov 2017]

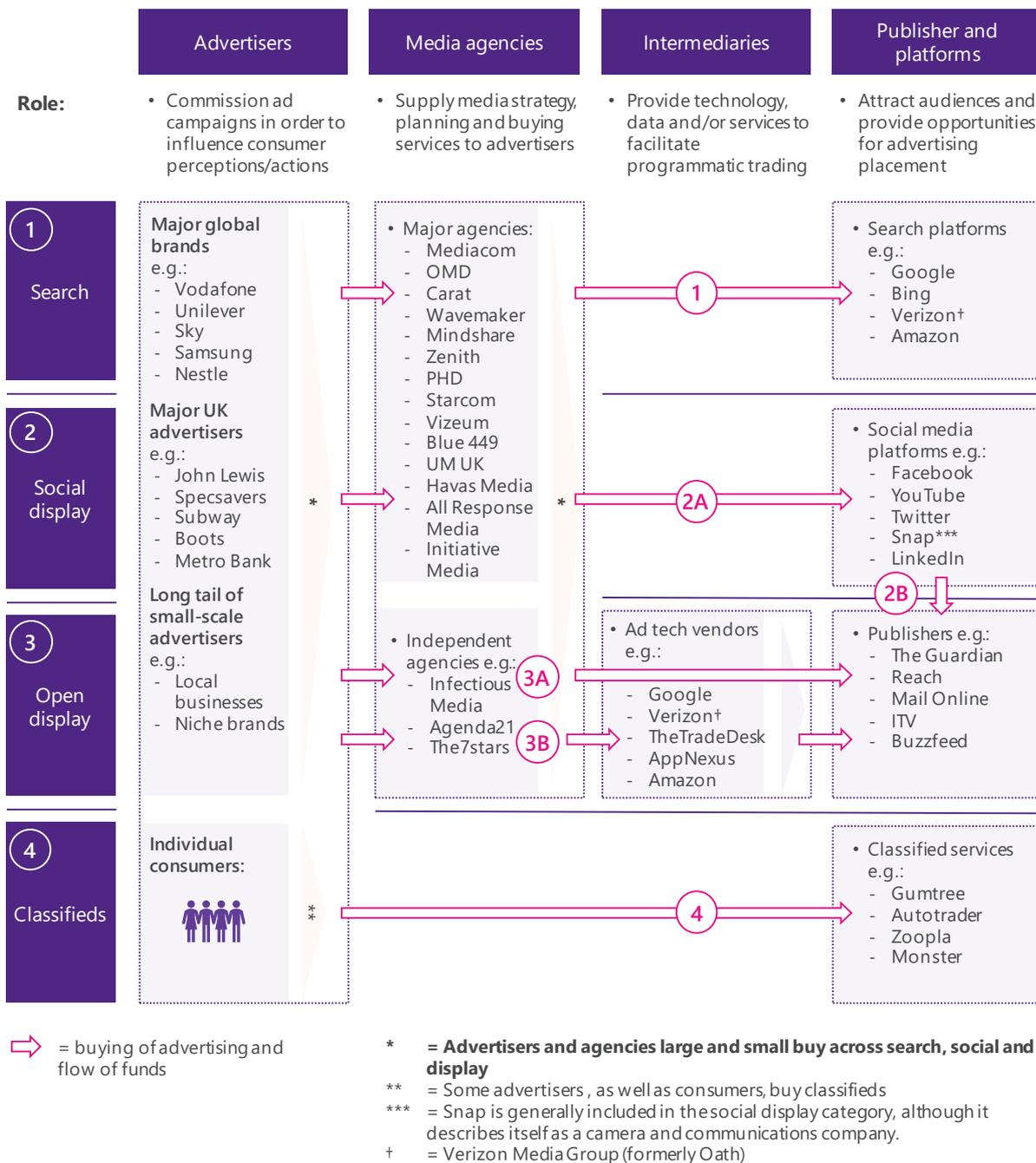
⁵⁸ Snap is generally included in the social display category, although it describes itself as a camera and communications company.

4 Value chain and roles

4.1 Overview of the online advertising value chain

The online advertising value chain involves advertisers and their media agencies (the demand side) buying advertising from publishers⁵⁹ and search and social media platforms (the supply side). Trading between these partners may be direct or involve one or more intermediaries.

Figure 4.1: Overview of the online advertising value chain



⁵⁹ In this report, we use the term publisher broadly to refer to any organization that attracts an audience to content or service it provides.

The structure of the value chain differs between the four main categories of online advertising. The open online display market is structurally complex, whilst the supply chain in search, social display and classifieds involves fewer participants. The key features of these value chains include:

- Search. Advertisers or their agencies buy direct from search providers (**1**) using these providers' self-service online sales interfaces, such as Google Ads, on which they bid for keywords⁶⁰. Search engines pay traffic acquisition fees to third-party referrers of traffic such as Apple (not shown above).
- Social display. YouTube, Facebook/Instagram, Snapchat⁶¹ and Twitter sell advertising inventory direct to advertisers and their agencies (**2A**) using self-service online sales interfaces which enable bidding or reservation buys. YouTube advertising inventory is also sold indirectly via Digital & Video 360, Google's demand-side platform (see definition in Section 4.3.4 below). In some cases, publishers distribute content on social media platforms, such as Facebook Instant Articles or YouTube, as well as their owned and operated services⁶². In these cases, advertising could be sold by the social media platform (**2B**) or the publisher, depending on the policies of the platform and the preferences of the publisher. YouTube shares revenue with rights holders and content creators. Third-party distribution accounts for a relatively small share of publisher online revenues – 5% of total US publisher digital revenues in 2017⁶³.
- Open display. The online display advertising value chain involves a complex ecosystem of intermediaries that enable programmatic trading between media owners⁶⁴ and advertisers/media agencies. Some advertising inventory is sold direct without the involvement of these intermediaries (**3A**). A large proportion of inventory is sold via intermediaries (**3B**). Section 4.2 describes this value chain in further detail.
- Classifieds. In many instances, advertisers are SMEs or individuals who buy direct from classifieds providers using self-service online sales interfaces (**4**).

4.1.1 The role of self-service sales interfaces

Major internet companies, such as Google, Facebook, Microsoft and Amazon, have developed automated online sales interfaces that enable them to sell ad impressions on their sites as major platforms or publishers, to large numbers of media agency and advertiser customers, including a long tail of small businesses. These interfaces allow customers to set campaign objectives and budgets, select target audiences and placements, and upload ad creative. The major internet companies also provide human sales and marketing support, mainly to large-scale customers.

Google Ads provides access to Google search, Google owned display inventory as well as third-party display inventory from Google publisher platforms, including Google Ads Manager. Facebook Ads Manager provides access to Facebook owned inventory (Facebook and Instagram) as well as third-party mobile app inventory on Facebook Audience Network.

⁶⁰ Major advertisers and agencies may use tools such as Adobe Advertising Cloud and Marin Software to optimise their search campaigns, but these tools do not intermediate between buyer and seller.

⁶¹ Snap is generally included in the social display category, although it describes itself as a camera and communications company.

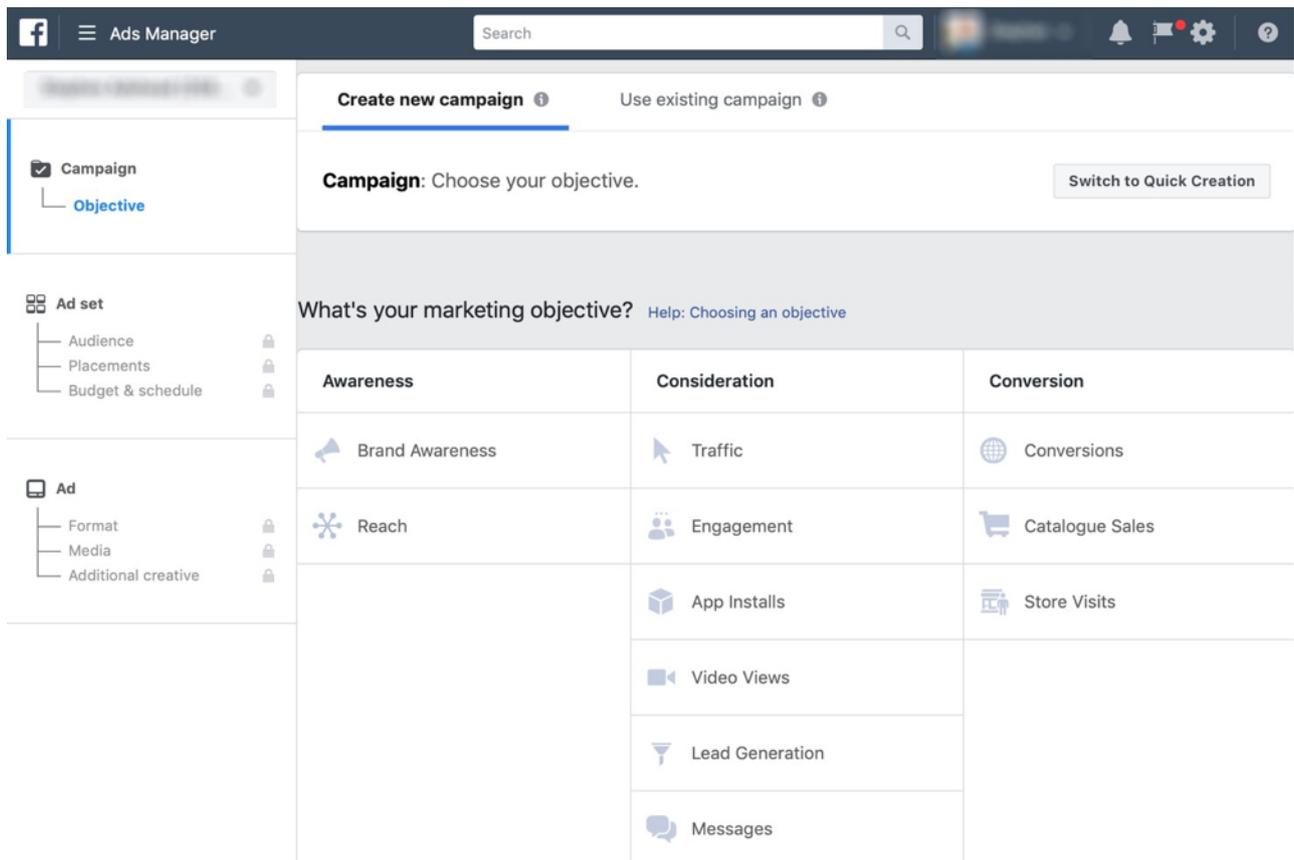
⁶² Publishers also distribute on third-party platforms other than social media, such as Apple News, which allows publishers to sell their own ads or to sell via Apple resellers, including Teads.

⁶³ Digital Content Next. (2018) *Digital Content Next Report Finds Facebook, Google Experiences Together Account for Less Than 5% of Total Digital Revenue for Publishers*.

Available at: <https://digitalcontentnext.org/blog/press/digital-content-next-report-finds-facebook-google-experiences-together-account-less-5-total-digital-revenue-publishers/> [Accessed on 10 Dec 2018]

⁶⁴ Throughout the report we use the terms "publisher" and "media owner" interchangeably to denote the owner of online content or application within which advertising can be displayed.

Figure 4.2: Example of a self-service sales interface – Facebook Ads Manager⁶⁵



4.2 The development of programmatic display advertising

The complexity of the open display advertising market value chain (elaborated in Section 4.3, below) is a consequence of the development of programmatic trading. At its inception in the 1990s, online display advertising was bought and sold through direct offline dealing between media owners and advertisers. Generally, advertisers ordered advertising impressions⁶⁶ in bulk in advance, with media owners fulfilling these orders as audiences visited their sites and generated advertising impressions⁶⁷.

As the online advertising market grew, advertising technology firms developed solutions to enable publishers to sell advertising inventory automatically, on an impression-by-impression basis, as and when impressions were created or in advance – programmatic trading.

Programmatic trading is the use of automated systems and processes to buy and sell inventory. This includes, but is not limited to, trading that uses real time bidding auctions (IAB definition)⁶⁸.

The main features of programmatic trading include:

⁶⁵ Facebook Ads Manager. [Accessed on 23rd November 2018]

⁶⁶ An online ad impression is an individual ad server to an individual user.

⁶⁷ A key feature of the online advertising market is that media owners do not have advance knowledge of who will visit their websites when, and consequently what advertising inventory will become available.

⁶⁸ IAB. (2014). *The Programmatic Handbook*. Available at: <https://www.iabuk.com/sites/default/files/The%20Programmatic%20Handbook.pdf> [Accessed on 16 Nov 2018]

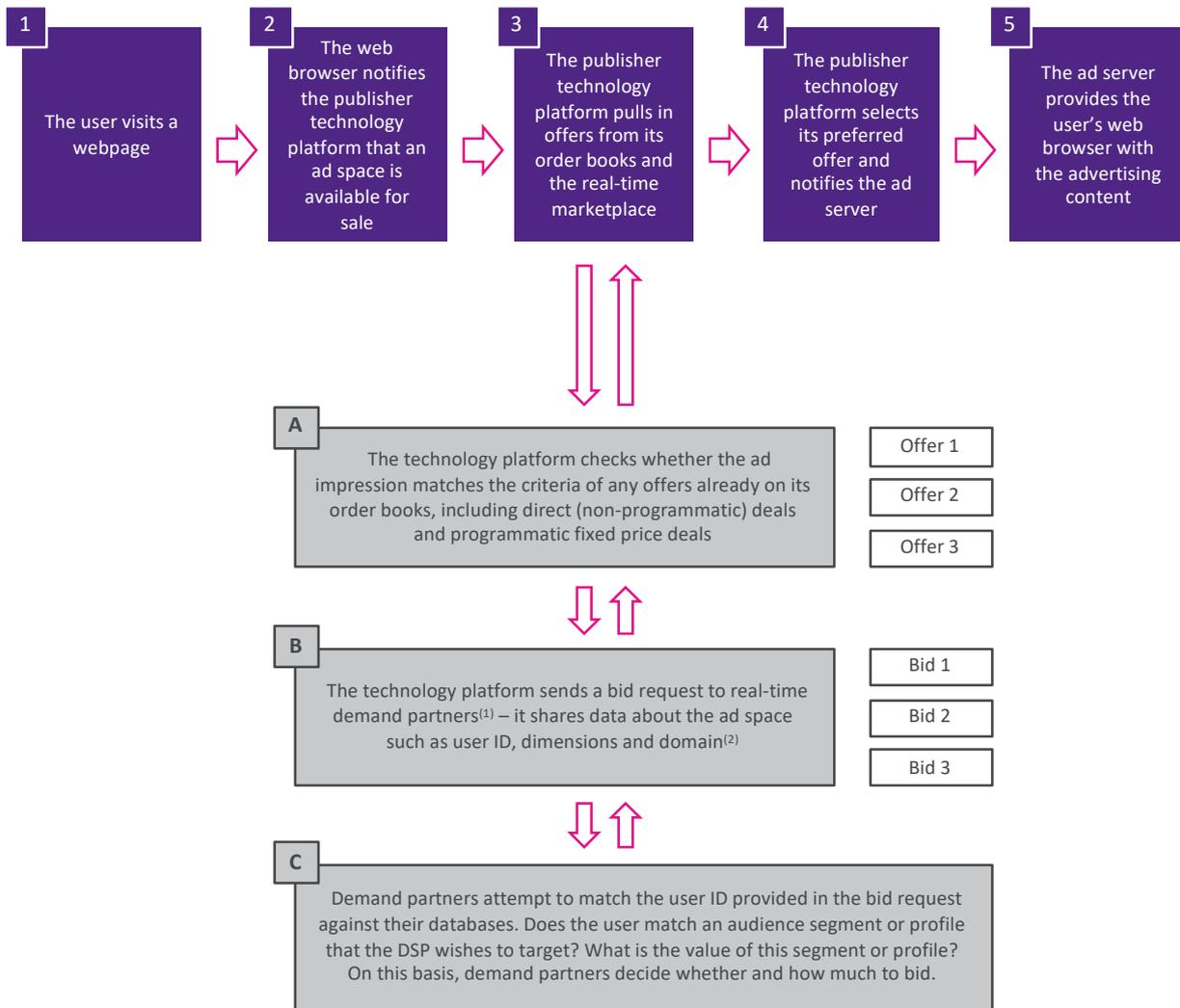
- Automation. Although advertisers and media agencies still use manual processes to define advertising strategy, develop plans and manage media buying, the execution of trading with publishers is automated.
- Targeting. In many instances, intermediaries leverage multiple data sources, matched with user ID⁶⁹ data provided by the publisher, to assess advertising impressions and provide advertisers with targeting options and/or campaign optimisation services.
- Aggregation. Intermediaries connect multiple buyers (advertisers/media agencies) with multiple sellers (publishers), allowing each to reach supply and demand sources that would not be economic to access through manual trading.
- Bidding. In many cases, intermediaries facilitate bidding in auctions, which may be public or private and may involve pre-agreed terms.

When a consumer visits a web page their browser notifies the publisher's technology platform which reviews any existing orders and sends a bid request to other potential buyers who then evaluate the advertising slot and make bids. The platform selects a preferred offer and serves the ad to the user web browser. The bidding process takes place in a timeframe of about 150 milliseconds, whilst the web page loads.

Programmatic trading involves high volumes of transactions daily – we estimate that every day hundreds of millions of ad impressions are sold programmatically in the UK. In most cases, each impression is sold in a separate auction, involving multiple bidders. Consequently, it is likely that over a billion bids are made daily and billions of user data points flow through the programmatic system.

⁶⁹ A user ID is a unique customer identifier by which a publisher identifies a user visiting its website – usually including only pseudonymous data.

Figure 4.3: Programmatic sales and ad serving process for online display advertising – simplified



- Notes:**
- (1) Demand partners include SSPs/ad exchanges and DSPs.
 - (2) Various different technical configurations can be used to solicit bids from the real-time marketplace including the ad server waterfall approach, client-side header bidding and server-side header bidding. These approaches differ in the order that bids are obtained - in sequence or in parallel – and which technology initiates the process – the ad server, browser header wrapper or the SSP.

In 2017, 80% of online display advertising (including social display and open display) was sold programmatically and 20% was sold via direct deals⁷⁰. Less than a quarter of programmatic sales (£0.65bn) were programmatic indirect – sold on an impression-by-impresion basis in real-time through an open, unreserved auction. The rest of programmatic display sales are programmatic direct – in which a direct relationship exists between buyer and seller in the form of pre-existing deal terms, such as agreed prices or price floors, including:

- Private marketplaces – invite-only auctions in which the media owner invites a small number of selected buyers to bid on its inventory and the media owner sets a price floor (fixed minimum price).
- Fixed price guaranteed deals – the buyer reserves certain inventory in advance at a fixed price.

⁷⁰ IAB. (2017). *IAB / PwC Media Owner Sales Techniques*. Available at: <https://www.iabuk.com/research/iab-pwc-media-owner-sales-techniques-most-2016> [Accessed on 17 November 2018]

- Fixed price non-guaranteed deals – the buyer and seller agree a fixed price in advance, but buyer does not reserve inventory.

Programmatic indirect and direct sales methods are not mutually exclusive in terms of set up. Publishers generally connect to several sources of supply in parallel or in sequence using programmatic direct and indirect methods (see Section 4.4, below).

Major publishers are increasingly using heading bidding for programmatic indirect sales. In December 2018, 76% of top 1,000 US websites used header bidding⁷¹. The majority of UK publisher interviewees used header bidding. Header bidding involves multiple SSPs (see definition below) bidding in parallel for each ad impression in an auction initiated from the user browser, in some cases via an SSP server. Prior to this development, publishers used a “waterfall” approach in which the publisher ad server called out to demand partners in sequence.

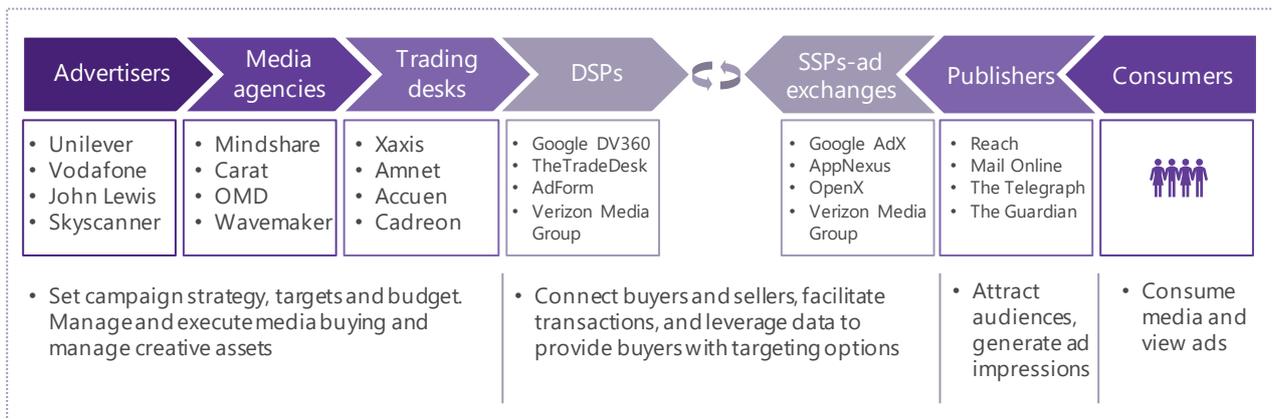
4.3 Open display market value chain

The online display advertising value chain involves a complex ecosystem of intermediaries that enable programmatic trading between media owners and advertisers/media agencies. Intermediaries add value by connecting buyers and sellers, facilitating trading, in some cases involving auctions, and leveraging user data and analytics to target advertising. Generally, trading is run by algorithms that aim to optimise buying to hit advertiser objectives and optimise selling to maximise publisher yield (revenue from a website/app visit). The value chain is relatively opaque insofar as sell-side business models and margins are not visible to buy-side participants and vice versa, and algorithms are proprietary “black boxes”. Some interviewees believe that market complexity and opaqueness have enabled certain participants to obscure high margins or hidden fees, although these practices are becoming less prevalent (see Section 6).

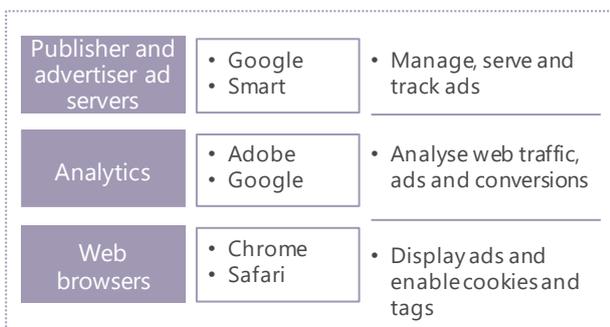
⁷¹ Adzerk. *Header Bidding Industry Index (HBIX)*. Available at <https://adzerk.com/hbix/> [Accessed on 14 Nov 2018]

Figure 4.4: Programmatic online display advertising value chain – simplified and generalised⁷²

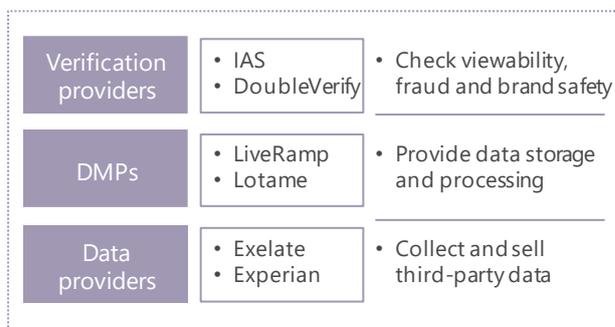
SUPPLY, DEMAND AND MARKETPLACE



SUPPORTING TECHNOLOGIES



DATA SERVICES



Participants

4.3.1 Participants: Advertisers

Advertisers include a wide variety of businesses, across all industries, as well as non-profit organisations. Automotive, consumer goods, retail, computers and software, travel, tourism and hospitality are the leading categories of online advertisers, accounting for 48.1% of online advertising expenditure in 2017⁷³. Barriers to entry are very low, with SME advertisers able to run campaigns on search and display at low levels of expenditure.

Advertisers pay to serve ads to consumers on online media in order to influence perceptions of their brands (brand advertising) and/or initiate an action, such as signing up for an offer or making a purchase (response advertising).

Generally, larger-scale advertisers retain media agencies to plan online display advertising campaigns and to buy programmatic display media. However, major advertisers are increasingly bringing programmatic buying in-house. In the US, 18% of sample of 119 brands had completely moved programmatic buying in-house in May

⁷² In some cases, SSPs-ad exchanges resell inventory on other ad exchanges leading to an extra step in the path between publisher and DSP.

⁷³ Standard Media Index (SMI). *SMI Ad Market Tracker*. (2018). Available at: <https://au.standardmediaindex.com/market-tracker/> [Accessed on 15 November 2018]

2018, whilst a further 47% had begun the process of internalising this function⁷⁴. Vodafone, the UK-based telecoms operator, plans to manage about two-thirds of its digital media investment itself, including programmatic media⁷⁵.

4.3.2 Participants: Media agencies

Media agencies provide media strategy, media planning and media buying services to advertisers. Major media agencies such as Mediacom and OMD offer these services across media, including television, print, digital, outdoor, cinema and radio. Smaller-scale specialists, such as Infectious Media, focus on programmatic buying.

Media agencies charge advertiser clients commission on the value of programmatic media purchased, performance fees or other fees for services provided. Some interviewees highlighted that in some cases media agencies generate additional value from demand-side platforms (DSP) suppliers in the form of rebates and/or free media in return for trading commitments.

4.3.3 Participants: Trading desks

Trading desks provide managed services (primarily teams of people) to coordinate and execute programmatic media buying. They are contracted by advertiser or agency clients to buy advertising from supply sources (DSPs, ad exchanges, SSPs (supply-side platforms)) and to optimise campaign performance. Trading desks effectively control how a programmatic advertising budget is spent.

In most cases, trading desks are part of major agency holding companies, such as Xaxis (WPP), Accuen (Omnicom), Amnet (Dentsu Aegis), Affiperf (Havas) and Cadreon (IPG), and consist of teams in a centralised unit or, increasingly, distributed within the holding company's media agencies. As noted in Section 4.3.1, certain advertisers buy programmatic advertising in-house and may have an in-house trading desk.

Trading desk pricing models differ and may include a percentage of media, payment by results, such as actions, or people fees.

4.3.4 Participants: Demand-side platforms (DSPs)

Demand-side platforms (DSPs) are services that enable media agencies, trading desks or advertisers to buy programmatic display advertising from sources of supply including ad exchanges, SSPs and media owners. DSPs add value and differentiate by bundling technology, ad inventory and, in some cases, data:

- Providing a platform and tools to help programmatic media buyers manage and execute campaigns. DSPs generally run algorithms that automatically bid for impressions, optimising against buyer objectives.
- Aggregating ad inventory from multiple sources of supply. Some DSPs specialise in certain categories of advertising inventory (e.g. TubeMogul – video) whilst others are generalists.

⁷⁴ IAB. (2018). *Nearly Two-Thirds of Brands Purchasing Ads Through Programmatic Means Have Fully or Partially Moved the Function In-house, According to IAB Research*. Available at: <https://www.iab.com/news/nearly-two-thirds-of-brands-purchasing-ads-through-programmatic-means-have-fully-or-partially-moved-the-function-in-house-according-to-iab-research/> [Accessed on 18 Nov 2017]

⁷⁵ Spanier, G. (2018). *Vodafone brings digital media-buying in-house in pioneering move*. Campaign. Available at: <https://www.campaignlive.co.uk/article/vodafone-brings-digital-media-buying-in-house-pioneering-move/1486379> [Accessed on 17 Nov 2018]

- Leveraging first- and third-party data and analytics to package ad inventory into audience segments, identify prospective customers, or identify impressions with a high probability of click-through.

DSPs business models generally involve commission on the value of media (ad inventory) purchased, although in some cases this is substituted for subscription fees for the use of technology platforms⁷⁶. DSPs may make additional revenue from bundled services such as data.

In many cases, media agencies, trading desks or advertisers contract with several DSPs in parallel in order to maximise the ad inventory available to buy and to encourage competition between suppliers.

4.3.5 Participants: Supply-side platforms (SSPs) – ad exchanges

Supply-side platforms (SSPs) are technology platforms used by publishers to automate the sale of online advertising inventory. They connect publishers to multiple sources of demand, including DSPs and other SSPs. Open ad exchanges are marketplaces connecting buyers and sellers and facilitating real-time auctions. In many cases, exchanges are operated by SSPs, but there are also standalone exchanges⁷⁷. SSPs also facilitate direct dealing such as private marketplaces. SSPs help publishers maximise ad revenue by using algorithms to set price floors, determine which buyers can bid and which data to disclose to buyers.

Publishers often connect to multiple SSPs, in a header bidding setup, in order to maximise the number of potential buyers for their ad inventory. One publisher interviewed for this research connected to 10 different SSP vendors. In this setup, publishers may use a third-party vendor to facilitate an auction involving other SSPs⁷⁸ - in this case, the vendor has visibility of bids from these SSPs.

In some cases, ad exchanges resell inventory on other ad exchanges leading to an extra step in the path between publisher and DSP. Interviewees noted that there are also aggregators that represent third-party ad inventory which they resell on exchanges.

Generally, SSPs are paid a revenue share (commission) by publisher clients. SSPs and ad exchanges may use first- or second-price auction models. Some interviewees highlighted that differences in auction methods and, in some cases, lack of transparency of these methods causes confusion amongst buyers.

4.3.6 Participants: Publishers

Publishers or media owners are operators of online content, applications or other online services that attract consumer attention and create opportunities for the insertion of online display advertising. The main categories of media owner include, with examples:

- Traditional publishers (websites and apps) – Guardian Media Group, Bauer Media, The Economist
- Digital-first publishers -Vice, BuzzFeed, Vevo
- Broadcasters online video services – ITV Player, 4oD (Channel 4), Sky Go

⁷⁶ AdExchanger. (2018). *The Entrepreneur's Guide to Ad Tech Business Models*. Available at: https://adexchanger.com/data-driven-thinking/the-entrepreneurs-guide-to-ad-tech-business-models/?_s=tap8emuh3egkbfppkst [Accessed on 15 Nov 2018]

⁷⁷ Until recently, open ad exchanges occupied a distinct position in the value chain, but most interviewees agreed that there is now a high degree of overlap between SSP and ad exchange offerings. These categories of market participant have to large extent merged. For instance, SSPs OpenX and AppNexus offer open exchanges as well as traditional SSP services.

⁷⁸ There are a range of different ways of implementing header bidding, such as client-side, server-side and hybrid approaches. Google offers Exchange Bidding, a header-bidding like service. The role of vendors differs in each case.

- App developers – King, Codemasters
- Ecommerce providers – Amazon, eBay

Many media owners use in-house sales teams to sell online display advertising as well as traditional advertising such as print, television or radio. In some cases, media owners have established joint digital sales operations, such as Ozone⁷⁹, a project involving Guardian Media Group, The Telegraph, News UK and Reach.

4.3.7 Participants: Consumers

Consumers increasingly have the ability to limit the online advertising they see using ad blocking software, and to limit personalised targeting by setting privacy settings in their browsers or on online services. Ad blocking is technology that consumers use to prevent the download or display of advertising⁸⁰ – desktop browser extensions are the most common form. Just under 25% of UK online adults claimed to use ad blockers in February 2018⁸¹ and usage is especially high among younger audiences, with 43% of 18 to 24-year-olds expected to use ad blockers in 2018⁸². However, a fifth of consumers who claimed to ad block did not have the ad blocker switched on.

Consumers are increasingly privacy-conscious. They can change browser settings to stop tracking - in Q4 2017, about 29% of users rejected cookies⁸³. Users can also change privacy and advertising settings on their accounts with Google (Google Account), Facebook (Ad Preferences) and other internet companies with logged-on users. However, the Norwegian Consumer Council found that the default settings on Facebook and Google are privacy intrusive and that *'The popups from Facebook, Google and Windows 10 have design, symbols and wording that nudge users away from the privacy friendly choices. Choices are worded to compel users to make certain choices, while key information is omitted or downplayed.'*⁸⁴

Supporting technologies

4.3.8 Supporting technologies: Publisher and advertiser ad servers

Publisher ad servers are technologies that manage publisher ad inventory, serve ads to users and manage advertiser creative tags. Ad servers make decisions about which ads to serve taking into account information about direct deals with media agencies (such as price, frequency caps, target volumes and audiences) and bids from demand partners. Forecasting and analytics are also part of ad server propositions.

Publishers typically use a single ad server due to the need for close technical integration between the ad server and publisher technology, such as content management systems. Ad servers generally charge a commission on sales of advertising.

⁷⁹ Davies, J. (2018). *Top UK publishers have a new alliance to compete with the duopoly*. Digiday UK. Available at: <https://digiday.com/media/alliance-publishers-uk-compete-duopoly/> [Accessed on 18 Nov 2017]

⁸⁰ IAB. (2018). *What Is Ad Blocking?* Available at: <https://www.iab.com/what-is-ad-blocking/> [Accessed on 17 Nov 2018]

⁸¹ IAB. (2018). *Ad Blocking - Consumer Usage & Attitudes*. Available at: <https://www.iabuk.com/research/ad-blocking-consumer-usage-attitudes-feb-2018> [Accessed on 19 Nov 2018]

⁸² Emarketer. (2018). *Ad Blocking in the UK 2018- Growth Slows as Behavior Becomes Part of the Mainstream*. Available at: <https://www.emarketer.com/content/ad-blocking-in-the-uk-2018> [Accessed on 17 Nov 2018]

⁸³ Flashtalking, *Cookie Rejection Report, Q1 2018*. Available at: https://www.flashtalking.com/wp-content/uploads/2018/08/Flashtalking_Cookie_Rejection_Report_2018.pdf [Accessed on 17 Nov 2018]

⁸⁴ Forbruker Rådet. (2018). *Deceived by Design – How tech companies use dark patterns to discourage us from exercising our rights to privacy*. Available at: <https://fil.forbrukerradet.no/wp-content/uploads/2018/06/2018-06-27-deceived-by-design-final.pdf>

Advertiser ad servers are the equivalent technologies used by advertisers and media agencies to store advertising creative (the ads), deliver these ads and keep track of this activity.

4.3.9 Supporting technologies: Analytics

Analytics software providers enable advertisers to monitor traffic⁸⁵ on their websites and apps, and to bring this data together with ad campaign and conversion data in order to analyse the impact that the advertising has made. Analytics may be a discrete software or service or integrated with other services, such as a DSP or ad server.

4.3.10 Supporting technologies: Web browsers

Web browser vendors have the ability to limit or influence what advertising formats and tracking methods are used. Google also has a strong position in the web browser market – Chrome market share is estimated at 49% across all platforms and 66% on desktop⁸⁶ - followed by Safari (Apple) and Firefox. In September 2017, Apple launched Intelligent Tracking Prevention (ITP) a Safari browser feature that limits the use of cookies⁸⁷. In February 2018, the Google Chrome web browser started blocking ads that are classed as intrusive by the Coalition for Better Ads, a group of advertising and online media companies (about 1% of ads)⁸⁸.

Data services

4.3.11 Data services: Ad verification providers

Ad verification providers offer independent analytics services that identify whether ad impressions are brand safe, viewable and non-fraudulent traffic – in other words, whether the ads were served in reputable content and seen by real people as intended. Generally, verification providers place tags on ads which collect data and report this back to their servers. The providers use analytics on this data to identify and flag:

- Potentially fraudulent ad impressions, such as impressions resulting from bot fraud.
- Non-viewable ad impressions, such as ads served on parts of a webpage the user does not scroll down to.
- Non-brand safe ad impressions, such as ads served against illegal, harmful or offensive content.

Generally, this process is conducted after ad impressions have been served. In some cases, ad verification providers also provide “pre-bid” analytics which predict the likelihood of ad impressions being non-valid (non-viewable, non-brand safe or fraudulent). Market participants use this information to inform bidding decisions.

The main ad verification and anti-fraud providers are Integral Ad Science (IAS), Moat (Oracle), Double Verify and White Ops. These companies generally charge for their services on a CPM (cost per mille (thousand impressions) basis, ranging from £0.01 to £0.06 for post-bid measurement and £0.02 to £0.16 for pre-bid

⁸⁵ Traffic generally refers to visits to a website.

⁸⁶ Stat counter Global Stats. (2018). *Browser Market Share United Kingdom*. Available at: <http://gs.statcounter.com/browser-market-share/all/united-kingdom> [Accessed on 18 Nov 2018]

⁸⁷ The Drum. (2018). *Intelligent Tracking Prevention: preparing for iOS 11 and Safari updates*. Available at: <https://www.thedrum.com/opinion/2017/09/12/intelligent-tracking-prevention-preparing-ios-11-and-safari-updates> [Accessed on 18 Nov 2018]

⁸⁸ Gibbs, S. (2018). *Google turns on default adblocker within Chrome*. The Guardian. Available at: <https://www.theguardian.com/technology/2018/feb/15/google-adblocker-chrome-browser> [Accessed on 17 Nov 2018]

analytics⁸⁹. In some cases, programmatic advertising intermediaries use more than one verification service due to differing requirements across their trading partners.

4.3.12 Data services: Data management platforms (DMPs)

Data management platforms (DMPs) provide central repositories for data as well as tools to collect, organise and analyse this data. Advertisers, agencies and media owners generally use DMPs to aggregate first-party data obtained from their customers with third-party data from data providers or programmatic trading partners. They then analyse this data to assess advertising impressions and review campaign performance.

Examples of DMPs include Oracle, Salesforce, Adobe, Lotame and Liveramp. In many cases, DMPs are not provided as standalone services. MediaMath, a DSP, also provides a DMP. Media agencies have developed DMPs as part of wider data offerings, such as Accordant Media (Dentsu Aegis) and mPlatform (WPP).

4.3.13 Data services: Data providers

Data providers sell data they collect from proprietary and third-party sources. Their customers include DSPs who use this data to assess advertising impressions available to buy in the programmatic marketplace. Examples of data providers include Experian and Equifax (credit referencing), eXelate (online household demographics, purchase intent, and behavioural propensities⁹¹) and Axiom (audience data). Pricing models include CPM or a percentage of the media bought using the data⁹².

4.4 Programmatic trading paths

The market participants described in Section 4.3, above, form multiple parallel trading paths that compete for advertising impressions. This phenomenon is driven by the incentive for publishers to maximise the number of demand sources they connect to and vice versa. As a consequence, publishers generally plug into multiple supply sources, with revenue coming through different paths.

For example, a publisher using a server-side header bidding, a solution for programmatic trading, would use a vendor such as Index Exchange or AppNexus to manage the header bidding process. This vendor would connect to multiple other SSPs/ad exchanges it integrates with, which would in turn connect to various DSPs.

⁸⁹ Vidakovic, R. (2018). *The Beginner's Guide to Digital Ad Fraud*. Adprofs. Available at: <https://adprofs.co/beginners-guide-to-digital-ad-fraud/> [Accessed on 17 Nov 2018]

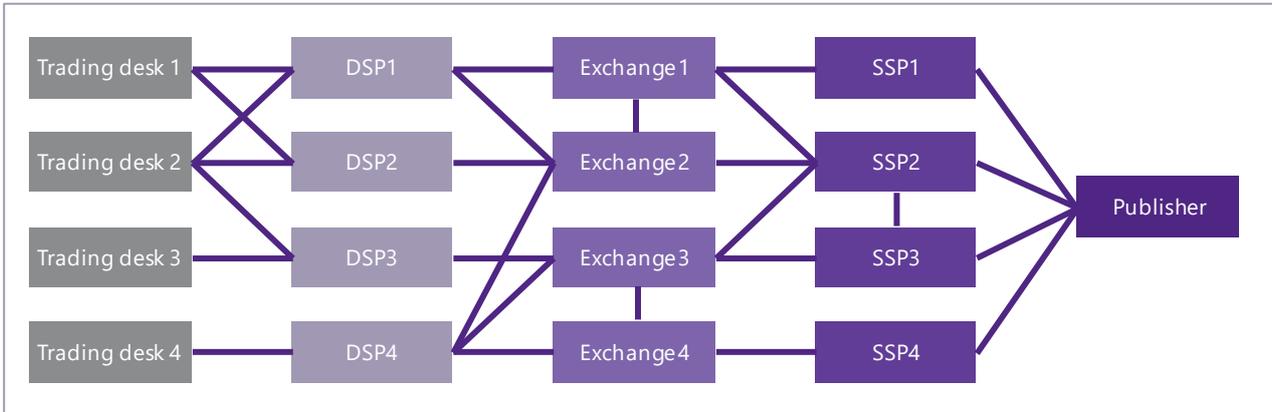
⁹⁰ Exchange rate of \$1=£0.79 applied.

⁹¹ IAB UK. *Exelate UK*. (2018). Available at: <https://www.iabuk.com/member-directory/exelate-uk> [Accessed on 18 Nov 2018]

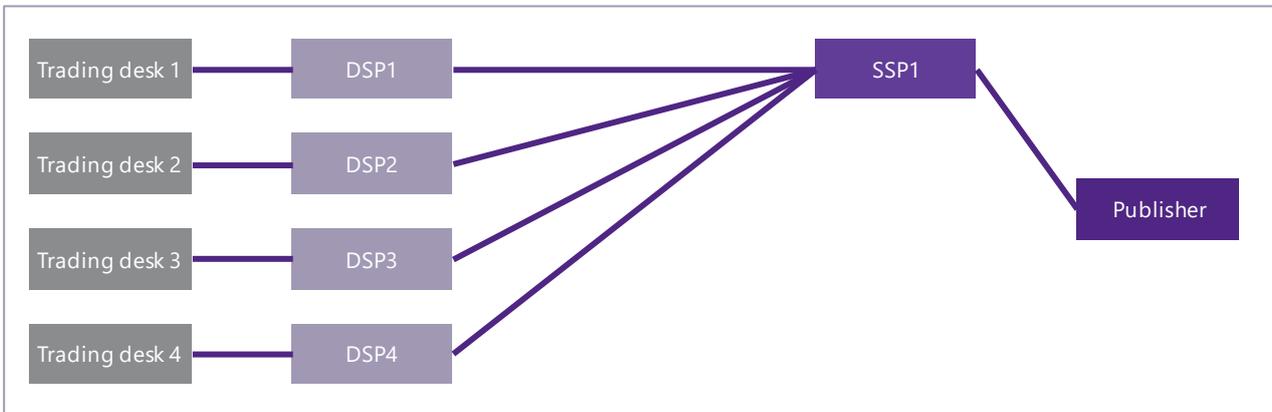
⁹² Hersher, J. (2018). *Why Some Data Companies Are Selling Data as A Percent of Media*. Ad exchanger. Available at: <https://adexchanger.com/online-advertising/data-companies-selling-data-percent-media> [Accessed on 15 Nov 2018]

Figure 4.5: Publisher online display trading paths

PROGRAMMATIC INDIRECT – (1) OPEN EXCHANGE



PROGRAMMATIC DIRECT – (2) PRIVATE MARKETPLACE, AND (3) GUARANTEED DEALS



In the programmatic indirect model, it is possible that a bid may reach a publisher via more than one exchange in series, given that exchanges link to each other as well as to supply and demand sources. Although this path involves more participants taking a cut, and consequently higher cost than a more direct path, it can be sustainable for low price ad inventory.

5 Market dynamics

5.1 Overview

In the online advertising market, publishers and social media platforms compete for share of audience and advertising expenditure; advertising technology vendors compete for intermediary services revenue; and media agencies compete for client services revenue. Major US internet companies have market leading positions in terms of advertising expenditure and intermediary services, whilst the media agency services market is split between six major global holding companies. These markets are increasingly global.

Figure 5.1: Competition in the online display advertising market

Market:	Publishers and social media platforms	Programmatic display intermediaries	Media agency services
Structure:	<ul style="list-style-type: none"> Major US internet companies - Google and Facebook - account for the majority of expenditure in search and display advertising UK broadcasters, news publishers and a long tail of other content providers compete for other display revenue 	<ul style="list-style-type: none"> Google is leader in the DSP and SSP/ad exchange markets The rest of the market is relatively fragmented, but consolidating Google, Verizon Media Group, AppNexus and AdForm are vertically integrated, operating on the buy- and sell-sides of the market 	<ul style="list-style-type: none"> Ownership of media agencies is consolidated amongst 6 major global holding companies Independent agencies have limited market share Each company operates portfolios of brands
Competitive dynamics:	<ul style="list-style-type: none"> Companies compete for audience and advertising revenue Competition is increasingly between the “walled gardens” of the major US internet companies and the open display advertising market 	<ul style="list-style-type: none"> Companies compete for advertiser, agency and publisher integrations and share of spend Major US internet companies leverage data, technology and ad inventory to gain competitive advantage 	<ul style="list-style-type: none"> Agencies compete for advertiser client accounts

Competition in these markets is affected by major US internet companies’ positions in adjacent markets, especially technology. Google provides ad servers, analytics, cloud services and other technologies that integrate with its programmatic intermediary services. It also has strong positions in the markets for web browsers (Chrome) and mobile operating systems (Android). The US internet companies also collect user data at scale which they use to enable targeting on their own advertising and on third-party advertising inventory – providing an advantage for their programmatic intermediaries.

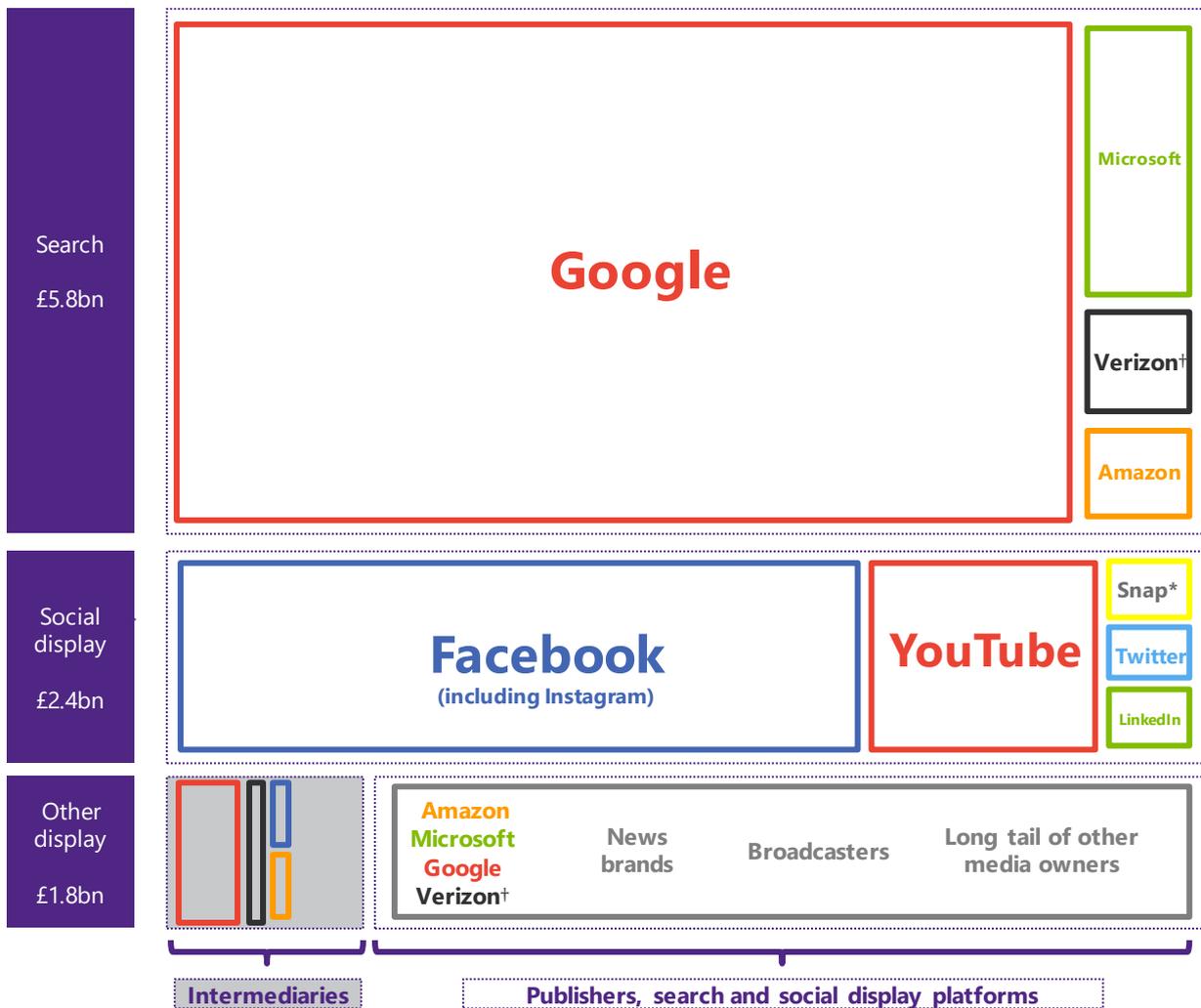
5.2 The role of major US internet companies

Major US internet companies capture the majority of search and display online advertising expenditure in the UK. They generate revenue in their roles as search or social media platforms and as intermediaries in the sale of display advertising by third-party media owners where they leverage user data to target advertising.

Google has a strong position in search, display media (YouTube) and display intermediaries (buy- and sell-side advertising technology platforms). Facebook has a strong position in display media. Amazon currently has a much smaller share of the online advertising market than either Google or Facebook, but some interviewees believe that it is growing strongly. It leverages Amazon shopper data in its DSP – a unique feature which is supporting growth in market share: some supply-side interviewees had seen Amazon DSP winning a substantial proportion of auctions during peak retail seasons, such as pre-Christmas.

There is very limited available data about UK online advertising expenditure by competitor. We have developed highly indicative estimates based on available data and feedback from interviewees. These estimates illustrate the approximate relative scale of major competitors, but do not provide a robust assessment of market share.

Figure 5.2: Indicative share of online advertising expenditure by major competitors, 2017



Ownership: = Google = Facebook = Microsoft = Verizon = Amazon = Snap = Twitter = Other

* Snap is generally included in the social display category, although it describes itself as a camera and communications company.
 † Verizon Media Group (formerly Oath)

Notes:

1. Areas are proportional to advertising expenditure.

2. Expenditure is net of agency share and, in the case of publishers, any intermediary take. It is gross of any pay-out to third-party publishers (YouTube) or traffic sources (search).
3. Based on PwC/IAB expenditure data (category totals) triangulated with share market data from industry interviews and other benchmarks – see appendix.
4. Publishers in the ‘other display’ segment are unevenly disintermediated. Major broadcasters generally do not sell inventory on open exchanges and retain a high share of agency investment relative to press publishers.

The major US internet companies operate data “walled gardens” (elaborated in Section 6.2). They do not share user identity data - consequently advertisers and agencies are unable to track users between the walled gardens. Many interviewees believed that competition in the online advertising market takes place between these walled gardens and the open internet display market.

Google and Facebook and, to a lesser extent, Amazon (GFA) have a unique scale and breadth of activity in the media owner/platform and intermediary markets, complemented by businesses in adjacent markets. In particular, GFA are distinguished by:

- Large scale of owned advertising inventory. GFA have access to large quantities of advertising inventory generated by their owned and operated services (YouTube video ads, Google paid search ads; Facebook and Instagram ads; and Amazon sponsored ads and display ads). About 77% of total UK online search and display advertising spending is on GFA advertising inventory.
- Well-developed advertising technology platforms. GFA intermediate in the purchase of advertising on third-party media owner services, leveraging their technology and data. Google has an end-to-end advertising technology offer, including a DSP, ad exchange, ad server and supporting analytics. Facebook operates an advertising network. Amazon has developed a DSP and a head-bidding solution⁹³.
- GFA have also developed technologies in adjacent markets such as web browsers (Google Chrome), operating systems (Google Android), cloud (Amazon Web Services, Google Cloud), artificial intelligence (Google Deep Mind) and virtual reality (Facebook Oculus).
- Extensive proprietary data. GFA have unique user data at scale gathered from across their portfolios of services. Google has extensive search data that provides insight into user intent, as well as behavioural data from services such as Gmail and Google Maps. Facebook has access to highly granular data about user social networks, interests and behaviours. Amazon has data about product searches and purchases conducted on its shopping platform which is valuable to advertisers seeking to target users making purchasing decisions.

Figure 5.3: Positioning of Google, Facebook and Amazon in the online advertising market

	Google	Facebook	Amazon
Owned ad inventory	<ul style="list-style-type: none"> • Google search • YouTube video • Display on Gmail, Maps • WAZE navigation app 	<ul style="list-style-type: none"> • Display and video ads on Facebook and Instagram 	<ul style="list-style-type: none"> • Sponsored ads on Amazon search results and product detail pages. Display ads and video ads on Amazon websites (Amazon, IMDb), apps (Prime Video) and devices (Fire TV stick)

⁹³ Header bidding is a programmatic sales solution for publishers.

<p>Intermediary services for third-party ad inventory</p>	<p><i>Demand side:</i></p> <ul style="list-style-type: none"> • Digital & Video 360 – DSP providing access to Google and third-party inventory • Google Ads – self-service buying platform providing access to Google and third-party inventory <p><i>Supply side:</i></p> <ul style="list-style-type: none"> • Ad Manager – unified platform for ad serving and programmatic trading, including an ad exchange (formerly AdX)⁹⁴ • Google AdSense – service connecting publishers to Google Ads demand. Self-service platform for smaller publishers • AdMob – mobile network/SSP serving mainly gaming apps 	<ul style="list-style-type: none"> • Facebook Audience Network targets Facebook audiences on mobile apps 	<p><i>Demand side:</i></p> <ul style="list-style-type: none"> • Amazon DSP provides access to Amazon and third-party ad inventory. It targets audiences using Amazon user data <p><i>Supply side:</i></p> <ul style="list-style-type: none"> • Amazon Publisher Services provides server-to-server header bidding solutions – Transparent Ad Marketplace and Unified Ad Marketplace
<p>Other technologies</p>	<ul style="list-style-type: none"> • Publisher and advertiser ad server • Chrome web browser • Android mobile operating system • Google Analytics web analytics • Google Cloud Services • Pixel mobile phones, tablets and laptops • Chromecast streaming devices • Google Home smart speakers and hub • Nest connected home devices 	<ul style="list-style-type: none"> • Oculus virtual reality technology 	<ul style="list-style-type: none"> • Fire tablets • Fire TV • Kindle e-readers • Echo smart speakers • Alexa voice assistant
<p>Proprietary data</p>	<ul style="list-style-type: none"> • Extensive user data from the suite of Google services and devices as well as partner integrations 	<ul style="list-style-type: none"> • Extensive social graph and data on the interests and activities of users 	<ul style="list-style-type: none"> • Deep data about Amazon customer product browsing and purchasing activity

5.3 Publishers and social media platforms

Social media platforms and publishers compete for audiences and advertising revenue. Social media services captured advertising expenditure of £2.4bn in 2017, 57% of total online display advertising expenditure. It is likely that news brands generated about £270m to £340m of online advertising revenue net of intermediary share⁹⁵, excluding international revenues⁹⁶. UK broadcasters are also major competitors in the online display market – primarily in-stream video. There is a long tail of smaller publishers and media owners. Importantly,

⁹⁴ Google’s ad exchange was formerly known as AdX.

⁹⁵ Mediaticque (Overview of recent dynamics in the UK press market) estimates total expenditure on news brands digital advertising at £487m in 2017, based on AA/WARC data. Agencies and intermediaries might take 30% to 45% of this expenditure (see Section 6), leaving news brands with £270m to £340m.

⁹⁶ UK news brands operate in the global English-language online content market and generate revenues from advertising on overseas audiences as well as UK audiences. The data in this report includes only advertising expenditure on UK audiences.

social, banner and video are distinct sub-segments of the display market, with different providers competing for audiences and advertising revenues.

The online advertising market generally rewards competitors who are able to deliver audiences at scale, with quality ad formats and targeting options – and the ability to demonstrate conversion or attribution. There is a premium for attractive or scarce audiences such as younger people or high-income consumers. Consequently, advertisers and agencies allocate a high share of expenditure to social media, primarily Facebook and YouTube which offer:

- High reach and frequency⁹⁷, especially among younger audiences.
- Strong advertising products/formats and tools available to buyers.
- Strong client relationships and service.
- Perceived advertising effectiveness in terms of return on media investment (see Section 5.3.1).
- Good supply of video advertising inventory.

Some interviewees noted that Facebook and Google are able to leverage a large scale of user data and sales resource to provide clients with data-driven insights during pitches, increasing the share of spend they win. It is more challenging for smaller-scale competitors to match these insights.

Some interviewees believed that Google and Facebook had used GDPR to strengthen their walled gardens by withdrawing third-party access to user IDs (see Section 6.2.3). Advertisers and agencies also allocate expenditure to publishers in the open market, although the supply of advertising available is relatively fragmented, with challenges around developing a joined-up view of audiences.

5.3.1 The role of measurement and attribution

Measurement of audiences and advertising effectiveness, and verification of ad delivery and viewability are important in influencing how advertisers/agencies plan, allocate budget and evaluate campaigns. Measurement and verification data are generally provided to advertisers/agencies by publishers/platforms and/or third-party measurement providers.

The major walled gardens have recently opened up to third-party measurement. Facebook works with a range of partners who provide audience measurement, audience verification (viewability, human traffic), brand measurement (impact of campaigns on brand metrics), lift measurement (impact on outcomes, such as sales), marketing mix modelling (analysis of sales driven by different media) and attribution (analysis of which marketing channels drive conversion)⁹⁸. Similarly, Google works with over 20 partners across YouTube and other Google products⁹⁹, such as comScore, Nielsen, Kantar, IAS, DoubleVerify, MOAT and Integral Ad Science.

Some experts believe that these third-party measurement providers are not fully independent and transparent, given that they are run for profit and rely on data provided by Google and Facebook. In Australia, competitors of Google and Facebook allege that unilateral measurement and verification by Google and Facebook may lead to overstatement of the performance of advertising on these platforms, such as the number of ad views. The Australian Competition & Consumer Commission (ACCC) found that:

⁹⁷ In advertising, frequency is the number of times that a user is exposed to an ad.

⁹⁸ See <https://www.facebook.com/business/m/measurement/partners> [Accessed on 19 Nov 2018]

⁹⁹ See <https://www.blog.google/products/marketingplatform/360/introducing-measurement-partners/> [Accessed on 19 Nov 2018]

'...it is not yet clear the extent to which third party measurement overcomes these issues. In particular, it is not clear whether the current terms on which third party verification providers have access to the Facebook and Google platforms enable them to carry out a reliable and fulsome audit of relevant ad metrics and measurements.'

In the video market, Google has expressed a will for YouTube to be part of joint industry currencies (independent and transparent measurement systems agreed and paid for by industry stakeholders) for TV around the world¹⁰⁰. YouTube is seeking measurement that reflects differences in its platform and data compared to television. In the UK, it has not yet reached an agreement with the Broadcasters' Audience Research Board (BARB), the JIC that measures TV audiences and is owned by the IPA and broadcasters¹⁰¹ (competitors of YouTube).

5.4 Programmatic display intermediaries

The market of programmatic display intermediaries is characterised by the strength of Google advertising platforms, vertical integration between certain buy- and sell-side competitors and ownership of major competitors by major US internet and technology companies. The following analysis focuses on the programmatic online display market excluding video, given that the online services of press publishers participate mainly in this market segment¹⁰². The analysis is relevant to all publishers operating in this market segment.

There is no publicly available data about the market shares of programmatic online display intermediaries. We developed highly indicative estimates of market concentration based on data and feedback from a relatively small sample of industry interviews¹⁰³. There was consensus that Google is the market leader on both the supply and demand sides, with the rest of the market relatively fragmented. Interviewees noted that market shares have a history of changing quickly due to changes in algorithms, auction methods and pricing, and the market entry of competitors such as Amazon.

Figure 5.4: Indicative market shares in the UK programmatic online display advertising market (excluding video)¹⁰⁴

Value chain role:	Demand-side platforms	Supply-side platforms
Market leader:	Google DV360 (30-50%)	Google (25-35%)
Other main competitors:	The Trade Desk AppNexus Verizon Media Group AdForm Amazon MediaMath	AppNexus OpenX Verizon Media Group Rubicon Project Index Exchange

¹⁰⁰ Bell, M. (2018). *What advertisers want: how audience measurement is changing*. Available at: <https://rts.org.uk/article/what-advertisers-want-how-audience-measurement-changing> [Accessed on 20 Nov 2018]

¹⁰¹ BARB is owned by BBC, Channel 4, Channel 5, IPA (Institute of Practitioners in Advertising), ITV, Sky and UKTV and is a not for profit company limited by guarantee.

¹⁰² The competitive environment differs between display sub-segments, such as banner display and video display, due to the different technologies used in each sub-segment.

¹⁰³ Share of revenue in the UK open programmatic display advertising market, excluding video. We asked interviewees to estimate market shares based on data for their company's allocation of expenditure (in the case of buy-side participants) or sources of revenue (sell-side participants), and any knowledge of how their company's spending/revenue differs from competitors. We discounted outliers, especially in cases where the interviewee had a vested interest in over- or under-estimating their own company's or a competitor's share. The sample size of 19 interviewees responding to these questions is small. Consequently, the data is subject to sampling error. However, there was consensus among interviewees about the market leadership position of Google.

¹⁰⁴ Share of revenue from online display advertising inventory traded in the open market, excluding video.

Google also accounts for 80% to 90% of publisher and advertiser ad server installations (see Section 5.4.3, below), has a strong position in technologies such as web analytics, and holds detailed user data. Most interviewees believed that control of these technologies and data gives Google with strong advantages in the intermediary market. On the supply side, in many cases Google technology runs decisioning and auctions, and bids in these auctions, creating potential conflicts of interest. However, interviewees noted that Google had become more neutral, following the end of the “last look” advantage (see Section 5.4.3, below). On the buy side, Google has the advantage of user data and integration with its sell-side platform.

Google, AppNexus, Verizon and AdForm participate on both the buy and sell sides of the market. Many interviewees believe this is a conflict of interest.¹⁰⁵ Some interviewees believe that Google discounts on the buy side in order to gain market share and makes returns through premium pricing on the sell side. Some interviewees also believed that Google’s DSP (DV360) has a preference for buying ad inventory from Google AdX over third-party SSPs/ad exchanges. However, Google Marketing Platform (including DV360) and Google Ad Manager (including AdX) are separate platforms and there is no sharing of data between the systems for reasons including compliance and legal.

There are also several advantages to vertical integration. Google claims that technical integration between DV360 and AdX provides benefits including better cookie matching, lower latency and confidence in inventory¹⁰⁶. Interviewees supported this claim and noted that the Google ad server also integrates well with other Google technologies, such as analytics, facilitating attribution modelling.

There has been consolidation in the intermediary market due to economies of scale in technology development. Ownership of major competitors is concentrated amongst major US internet and technology companies, including: Google, Amazon, Verizon and AT&T (AppNexus).

5.4.1 DSPs

There was consensus amongst interviewees that Google Digital and Video 360 (DV360) is by far the largest DSP in terms of share of UK programmatic display advertising expenditure¹⁰⁷. Estimates of market share were generally in the range 30% to 50%.

DSPs differentiate on technology platform, sources of advertising inventory, data and targeting options, and transparency. Some agency interviewees believed that DV360 has competitive advantages in terms of:

- Product offering, especially ease of use.
- Competitive fees, with segmentations available at no extra charge.
- Exclusivity of YouTube inventory on DV360¹⁰⁸.
- Segmentations based on user data from Google services.
- Integrations with other Google technologies, such as AdX, enabling ease of cookie matching.
- Google sales engagement with advertiser clients¹⁰⁹.

¹⁰⁵ See Section 7.3 for further discussion of this issue.

¹⁰⁶ Google Ad Manager Help. (2018). *How Google Ads and Display & Video 360 work with Ad Exchange*. Available at: https://support.google.com/admanager/answer/7014770?hl=en&ref_topic=7520097 [Accessed on 17 Nov 2018]

¹⁰⁷ Excluding video.

¹⁰⁸ Google owned inventory, such as YouTube, WAZE and Gmail, is available only on Google buying platforms: DV360 and Google Ads.

¹⁰⁹ DSPs generally work for agency trading desks. However, agency interviewees noted that advertisers increasingly select and contract with DSPs directly. Consequently, Google sales engagement with advertisers provides it with an advantage.

Other major competitors include The Trade Desk, Verizon, MediaMath, AdForm and Amazon. Agency and advertiser interviewees used these competitors for access to particular data or inventory sources, for the strength of the technology platforms or for reasons of transparency.

5.4.2 SSPs/ad exchanges

There was consensus amongst interviewees that Google is the market leader in the UK programmatic online display SSP/ad exchange market¹¹⁰ with market share estimates generally in the range 25% to 35%. Several interviewees believed that Google's market share has decreased due to publishers implementing heading bidding, a programmatic sales method in which SSPs compete for impressions in parallel. Prior to this development and a change to its auction set-up (see Section 5.4.3, below), Google's ad exchange had advantages over other sources of demand. One interviewee noted that Google market share is lower in the UK than other European markets due to the proactive approach of UK publishers in adopting header bidding and encouraging competition. Currently, Google's main competitive advantages include integration with demand from Google Ads¹¹¹ and with the Google ad server: some interviewees commented that it is very easy to "switch on" the Google ad exchange when the Google ad server is installed.

The other main competitors include AppNexus, Verizon, Rubicon Network and Index Exchange. Competition between these companies is strong, demonstrated by price cuts late in 2017¹¹². Given that publishers often integrate with multiple SSPs which bid in parallel for each ad impression, there is the potential for market share to change quickly. Importantly, there is a long tail of operators who aggregate smaller-scale publishers and resell on exchanges/SSPs. In some cases, these operators are domiciled in overseas territories, such as Snigelweb (Ireland) and Pub Galaxy (Bulgaria).

5.4.3 Ad servers and other technologies

There was consensus amongst interviewees that Google accounts for the vast majority of the ad server market, with estimates of share generally in the range 80% to 90% of both publisher and advertiser installations. Where installed, Google's publisher ad server compares orders and bids and decides which ad to serve. Until March 2017, Google leveraged this position to provide its own ad exchange with an advantage in the form of the "last look": Google would wait for other exchanges to submit their bids, then give its own ad exchange the chance to outbid the highest of these bids¹¹³. Google ceased this practice following the growth of header bidding which allowed publishers to run a fairer auction on the browser. Some interviewees believe that, despite these developments, the Google ad server is not fully transparent and might still provide the Google ad exchange with an advantage due to visibility of publisher information such as price floors. One interviewee noted that Google also has other control points which may give it advantage: the interviewee believed that in mobile in-app advertising Google pays only for ads that it deems viewable and Google's assessment of viewability is not fully transparent.

Many interviewees noted that Google products together have the advantage of ease of integration in terms of technology and data. On the demand side, Google ad server integrates with Google analytics, whilst on the supply side, Google's ad server integrates with its ad exchange. Given that Google does not allow portability of user data outside its platforms (see Section 6.2.3), in areas such as analytics and attribution Google solutions have an advantage over third-party products.

¹¹⁰ Excluding video.

¹¹¹ Since 2016, Google Ads demand has been available to third-party SSPs through an API and other methods.

¹¹² Sluis, S. (2017). *AppNexus CEO Brian O'Kelley On Waging A Price War*. Ad Exchanger. Available at: <https://adexchanger.com/platforms/appnexus-ceo-brian-okelley-waging-price-war/> [Accessed on 17 Nov 2018]

¹¹³ <https://adexchanger.com/platforms/google-removes-last-look-auction-advantage/>

Google also has a strong position in the web browser market – Chrome market share is estimated at 49% across all platforms and 66% on desktop¹¹⁴.

5.5 Media agency services

Ownership of media agencies is consolidated amongst 6 major global agency holding companies (WPP, Omnicom, Dentsu Aegis, Publicis, IPG and Havas), which each operate portfolios brands of including media agencies and other marketing communications providers such as advertising creative agencies, direct marketing agencies and PR agencies. Agencies independent of the top 6 holding companies accounted for only 5% of total billings of the top 20 UK media agencies in 2017.

Figure 5.5: Top 20 UK media agencies by billings (all media)

Agency	Holding Company	Billings 2017 (£m)
Mediacom UK	WPP	1,333
OMD	Omnicom Group	774
Carat UK	Dentsu Aegis	753
MEC	WPP	672
Mindshare Media UK	WPP	539
PHD UK	Omnicom Group	524
Starcom	Publicis Groupe	469
Zenith	Publicis Groupe	453
Maxus	WPP	427
Vizeum UK	Dentsu Aegis	320
Blue 449	Publicis Groupe	268
The7stars	Independent	246
UM UK	IPG	192
Havas Media	Havas	161
All Response Media	Havas	151
Initiative Media London	IPG	142
Goodstuff Communications	Independent	112
M/six	WPP	101
Arena Media	Havas	98
Spark Foundry	Publicis Groupe	75

Source: Campaign¹¹⁵

¹¹⁴ Stat counter Global Stats. (2018). *Browser Market Share United Kingdom*. Available at: <http://gs.statcounter.com/browser-market-share/all/united-kingdom> [Accessed on 18 Nov 2018]

¹¹⁵ Campaign. (2018). *Campaign Intelligence Reports*. Available at: <https://www.campaignlive.co.uk/intelligence/extended-school-reports> [Accessed on 17 Nov 2018]

6 Supply chain analysis

We have explored the money flows, data flows, ad flows and control points in the following five scenarios. Scenarios 1 to 4 illustrate the main supply chain paths for publishers (including press publishers and other online publishers), whilst scenario 5 shows the path for sales of social media and search advertising.

Figure 6.1: Online advertising supply chain scenarios

Scenario	Owner of ad inventory	Sales method	Description and examples ¹¹⁶
1	Publisher	Programmatic indirect	The publisher sells ad impressions via an open exchange, involving an auction that is open to all demand sources on that exchange. <i>Reach sells a website ad on OpenX open exchange – PHD Media uses the DV360 DSP to make the winning bid for a Volkswagen campaign.</i>
2	Publisher	Programmatic direct – private marketplace	The publisher SSP facilitates a private auction involving selected DSPs and pre-agreed terms, such as a price floor. <i>The Telegraph sets up a private marketplace for GroupM, Dentsu Aegis and OMG using the Rubicon Project SSP. It provides interest data segments, such as travel – OMG uses DSP AdForm to make the winning bid for a BA campaign.</i>
3	Publisher	Programmatic direct – guaranteed deal	The publisher makes a direct deal with an advertiser, agency or trading desk, such as a reservation of inventory at a fixed price, and the SSP and DSP facilitate delivery of ad impressions. <i>The Guardian sells 1 million ad impressions to GroupM at a fixed price. GroupM issues an I/O¹¹⁷ using the DV360 DSP which submits this to the Index Exchange SSP. The DSP and SSP automate delivery of the order.</i>
4	Publisher/internet platform	Internet platform direct sales	The publisher distributes content on a third-party platform/service, such as Facebook Instant Articles, and allows the third-party to sell ads on its behalf. <i>Reach distributes content on Facebook Instant Articles and allows Facebook to sell advertising. Facebook sells an ad direct to agency Publicis to extend the reach of a social media campaign for Nike.</i>
5	Social media platform	Direct sales – self-service	The social media or search platform sells directly to advertisers or agencies using a self-service online sales platform. <i>Google sells YouTube in-stream video advertising to a small business via the Google Ads self-service interface.</i>

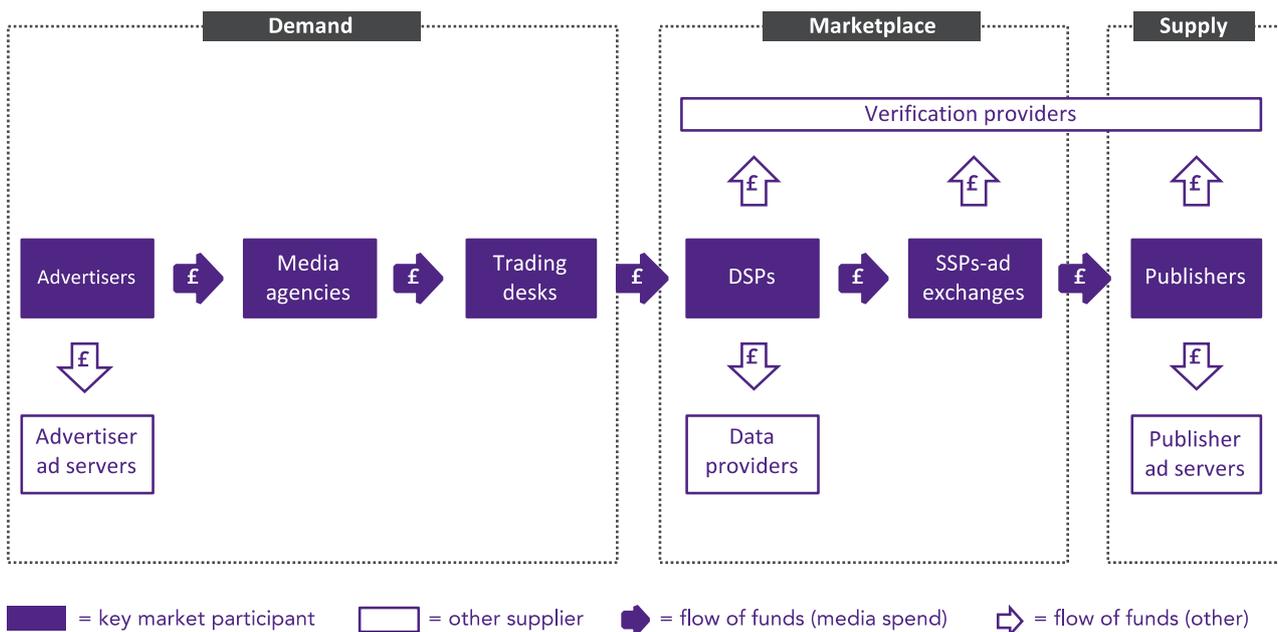
¹¹⁶ Hypothetical examples – these do not represent actual client-agency-DSP or publisher-SSP relationships, or the trading practices of the companies mentioned.

¹¹⁷ Insertion order

6.1 Money flows

In scenarios 1 to 4, money flows from advertisers to publishers (press and other) via a series of intermediaries who are paid a share of the media expenditure, a CPM, a fixed fee or by results. Figure 6.2, below, provides a simplified illustration of money flows in scenarios 1, 2 and 3. In scenario 4, the third-party internet platform sells directly to advertisers or agencies. In scenario 5, money flows direct from advertisers or media agencies to social media or search platforms – we do not discuss this case further, given that the platforms receive 100% of revenues.

Figure 6.2: Money flows in the programmatic display advertising value chain - simplified



There are various different configurations of these money flows, depending on how contracts between participants are formed. For example, advertisers may contract directly with DSPs instead of via an agency or its trading desk.

The rest of this section explores money flows in scenarios 1 to 4 which involve publishers (press and other). In each case, we have analysed the proportion of advertiser investment that reaches the publisher and which participants take a share along the way.

Importantly, the share of advertiser investment received by publishers is just one of several factors that affect publisher advertising revenues. Market prices, competition, cookie match rates (see Section 6.2.2) and levels of ad blocking also have a significant impact on publisher online advertising revenues.

6.1.1 Methodology

There is no UK market data for the share of advertiser investment received by publishers, or the share taken by each category of intermediary. It is not feasible to collect census data across the market for reasons including:

We developed indicative estimates of the share of spend taken by intermediaries based on feedback from a small number of industry experts. We asked these experts to estimate the rates charged by each type of intermediaries, including a range and a mid-point, in certain scenarios.

Notes on our estimates:

- Hidden costs, discrepancies¹¹⁸ and transfers between intermediaries (such as rebates and free media¹¹⁹) are excluded. Some interviewees believed that these factors are significant in scale, including one publisher that claimed to pay rebates of up to 15p in the pound.
- Ad serving costs are excluded. Interviewees estimated that publisher ad server costs are equivalent to about 1% of publisher revenues.
- Costs are represented as percentages but are, in some cases, charged as CPM or fixed fees. Targeting data and verification fees are in many cases priced as a CPM. In certain cases, trading desks operate an undisclosed model and are paid by results not a percentage of media. Some DSPs charge a platform fee instead of a share of media expenditure.
- The sample size is small, and experts were typically able to comment only on buy- or sell-side intermediaries, given lack of visibility across the value chain. Consequently, there is potential for sampling error.
- The estimates refer to the specific case of major publishers trading with major agencies in the programmatic display market, excluding video. The results are relevant to major press publishers operating online as well as other major publishers, such as digital-first publishers. The results are not relevant to broadcaster online video services. Percentages will differ in the case of smaller agencies, advertisers and publishers, and in the case of video advertising.

The Incorporated Society of British Advertisers (ISBA) plans to conduct a detailed analysis of money flows in the programmatic value chain in 2019, matching data between the buy and sell sides. This will provide a more robust estimate of publisher share after all disclosed and hidden costs.

6.1.2 Findings

Given the current programmatic advertising market structure and practices, it is not possible to develop robust, independently verified, census level data for the share of advertiser investment received by publishers or intermediaries.

Our best estimate is that publishers receive about £0.62 (range £0.43 to £0.72) of every pound of advertiser investment in the programmatic open exchange scenario in an idealised case, excluding any hidden fees, discrepancies and fraud. This estimate is based on claimed commissions/revenue shares, not a forensic analysis of trading, and is higher than other industry estimates (see Section 6.1.2.1, below).

Hidden fees and arbitrage have the potential to reduce publisher share compared to our estimates. Generally, interviewees believe that the programmatic market has adopted more transparent, disclosed buying models in which there is limited arbitrage. But some experts highlighted that hidden fees are difficult to detect and likely to be continuing in parts of the market. It was not within the scope of this project to conduct a forensic investigation into any hidden fees or identify the mechanisms through which these might occur.

The share of advertiser investment that publishers receive varies significantly on an impression-by-impression basis depending on the vendors involved (rates differ between DSPs and SSPs), the size of the advertiser and publisher (larger players obtain better deals) and the type of advertising campaign (some highly-targeted

¹¹⁸ Discrepancies may occur between the records of publisher ad servers, SSPs and DSPs for reasons such as: different methods for counting impressions and filtering out invalid traffic; ad blocking; and ad servers not logging an impression due to latency problems. In these cases, publishers might not be paid for all the impressions their records show having been served.

¹¹⁹ Interviewees believed that in some cases suppliers offer agencies rebates or free media in return for spending commitments.

campaigns involve a high data spend). The combination of a high-priced agency, trading desk, DSP and SSP, and large data fees, could leave a publisher with less than £0.45 in the pound. In an outlier case of a highly-targeted campaign making heavy use of third-party data, publisher share would be lower still.

Interviewees believed that the share of advertiser investment taken by intermediaries has decreased as competitors have lowered fees due to competition and client demand for transparency. We estimate that over the last 2-3 years this decrease represents up to £0.15 of every pound of advertiser investment. In 2017, a price war amongst SSPs led to reduced fees, with one vendor halving its fees¹²⁰. On the buy side, interviewees noted that trading desk fees have fallen from 15% to an average 12% or less, and DSP fees have also decreased. Some interviewees also believe that the proportion of advertiser investment allocated to third-party data has decreased.

Publishers receive the highest share of advertiser investment in the case of programmatic guaranteed deals, in which they have a direct relationship with the buyer: £0.75 in an idealised case. In the private marketplace scenario, publishers receive £0.67 in an idealised case. However, these sales methods are less prevalent than the use of open exchanges - agencies only make direct deals in certain cases. Guaranteed deals also involve in-house sales costs for the publisher.

Programmatic indirect trading is least favourable for publishers in terms of the share of advertiser investment they receive, but this method connects publishers to sources of supply that they would not otherwise have access to - it is useful for selling ad impressions generated by overseas audiences.

As noted in Section 5.4, intermediaries add value by connecting buyers and sellers, facilitating trading and layering on data and segmentations to enable targeting. Most interviewees believed that most intermediaries provide valuable services and invest in technology and people in order to deliver these services.

Interviewees with visibility of DSP or SSP contracts reported that Google prices competitively on the buy-side, but at a premium of up to twice some competitor rates on the sell-side. In a case in which Google is used on both the buy and sell sides, its total share of spend is likely to be neither highest nor lowest compared to possible combinations of competitors.

In terms of share of advertiser investment taken by intermediaries at each level of the value chain we found:

- Agency of record (media agency) fees are generally in the range 2% to 8%. Media agencies charge a higher rate for digital than TV or print because digital media buying is more complex and labour intensive, with media agencies generating less revenue per head in digital than traditional media. Media agency fees vary depending on the services provided and the bargaining power of the advertiser.
- Trading desk fees vary depending on the pricing model, bargaining power of the advertising client and sales path. In an undisclosed pricing model, in which the trading desk is paid for results not on a share of media, the trading desk margin is variable and may exceed 20%. In a disclosed model, interviewees estimated that the trading desk charges fees of about 10% to 12%. Interviewees believe that the market is shifting towards more transparent disclosed pricing models. Trading desk rates are lower for the programmatic guaranteed case than programmatic direct or private marketplaces, due to the lower trading desk workload in this case – deals are made in advance.
- DSP fees vary according to the bargaining power of the advertiser or agency client and differ between vendors. Interviewees believed that DSP execution fees in the range 7% to 10% are typical for larger agencies, but smaller agencies and advertisers buying direct may pay more. In some cases, DSPs charge

¹²⁰ Sluis, S. (2017). *AppNexus CEO Brian O'Kelley On Waging A Price War*. Ad Exchanger. Available at: <https://adexchanger.com/platforms/appnexus-ceo-brian-okelley-waging-price-war/> [Accessed on 17 Nov 2018]

higher fees by bundling additional services such as access to targeting data or segmentations (see below). The Trade Desk revenue was 20% of gross advertising spend in 2017¹²¹.

- Targeting data fees vary significantly by advertiser and type of campaign. Generally, these data costs are charged as a CPM not as a share of media and may be bundled with DSP costs. Interviewees believed that third-party data has limited value and average data expenditure was equivalent to about 7% of investment. Interviewees noted that Google offers rich audience segments “for free” on DV360, reducing the need for additional data. Furthermore, some advertisers have extensive first-party data and have limited need for third-party data. In certain cases, advertisers need to reach a particular audience and would spend more on targeting data to facilitate this – sometimes over 50% in highly targeted response campaigns.
- Verification is generally charged on a CPM basis, with buy-side fees equivalent to 1% to 2% of advertiser investment. Verification providers also work with sell-side participants who may absorb their fees.
- SSP fees are generally charged as a percentage commission on publisher revenues. Rates for major publishers are in the range 10% to 25% for indirect sales involving an open exchange. Small-scale publishers may pay higher rates due to lower bargaining power with SSPs. Interviewees noted that Google rates are at the high end of the range (20% to 25%), with some competitors charging half this rate (about 10%). SSP fees are highest for the programmatic indirect case involving an open exchange and lowest for programmatic guaranteed deals.

6.1.2.1 Comparison with other studies and tests

Studies by the World Federation of Advertisers (WFA) and ANA/ACA/Ebiquity/ADFIN indicate that publishers receive 39% to 46% of advertiser investment, whilst test buying by The Guardian showed that this ratio can be as low as 30% in a “worst case scenario” – see Figure 6.3, below. These figures are significantly lower than our estimate of 62% for the comparable open exchange case. There are three main reasons for these differences:

1. The WFA, ANA and Guardian data points are over two years old. Interviewees reported that intermediary fees have recently decreased – we estimate by up to about 15% as a share of advertiser investment. In December 2018, The Guardian Chief Revenue Officer stated that “*We replicated the test [buying own inventory] recently and it showed a split we were happy with.*”¹²²
2. The Guardian quoted a worst case. It did not disclose an average or high case. In addition, in its test the Guardian is likely to have paid higher agency, trading desk and DSP fees than major advertisers which have more bargaining power with suppliers.
3. Our estimates exclude the effects of any hidden fees, discrepancies, rebates and fraud which may have been included in the Guardian test.

¹²¹ The Trade Desk, *Third Quarter 2018 Investor Presentation, November 8, 2018*. Available at: <http://investors.thetradedesk.com/static-files/84737e6a-3551-416d-8328-0e50016889a3> [Accessed on 17 Nov 2018]

¹²² Davies, J. (2018). ‘GDPR will ultimately be good for the industry’: Guardian CRO Hamish Nicklin on 2019 plans. Available at: <https://digiday.com/media/gdpr-will-ultimately-good-industry-guardian-cro-hamish-nicklin-2019-plans/> [Accessed on 17 Nov 2018]

Figure 6.3: Estimates of share of advertiser programmatic investment received by publishers

Study	Date	Data source / methodology	Publisher share of advertiser investment
World Federation of Advertisers ¹²³	2014	Input from industry experts	40%
ANA, ACA, Ebiquity, AD/FIN (US, Canada) ¹²⁴	Jul 2015 to Dec 2016	Analysis of 16.4 billion media impressions (buy side, excluding trading desk fees) and estimates (sell side and trading desk fees)	39% to 46%
The Guardian (UK) ¹²⁵	Oct 2016	Test buying of own ad inventory	30% in "worst case scenarios". Average not published
Plum Consulting (UK)	Nov/Dec 2018	Input from UK industry experts	62% with a range of 43% to 72%

¹²³ World Federation of Advertisers (WFA). (2014). *WFA guide to What Every Advertiser Should Know about Media Markets Programmatic Media*. Available at: <https://www.wfanet.org/app/uploads/2017/04/programmatic.pdf> [Accessed on 17 Nov 2018]

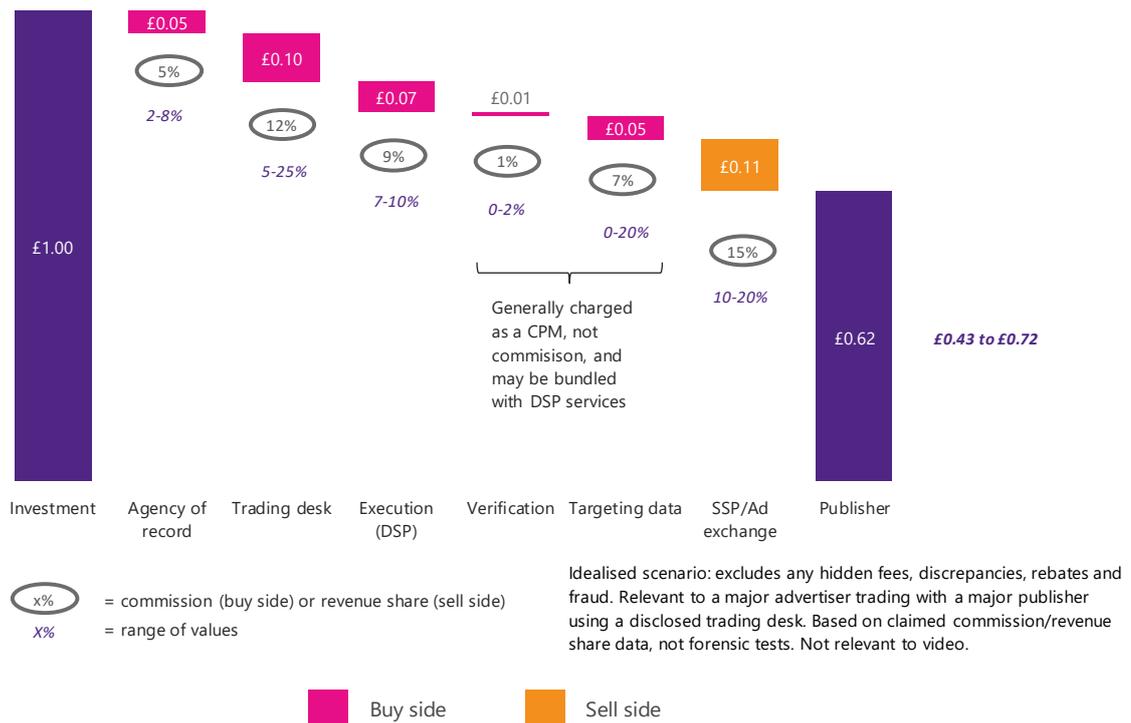
¹²⁴ Ebiquity, ANA, ACA, Ad/Fin. (2017). *Programmatic: Seeing through the financial fog. An In-Market Analysis of Programmatic Media at the Transaction Level*. Available at: <https://www.acaweb.ca/en/wp-content/uploads/sites/2/2017/07/2017-ACA-ANA-Programmatic-Study-FINAL.pdf> [Accessed on 19 Nov 2017]

¹²⁵ Pidgeon, D. (2016). *Where did the money go? Guardian buys its own ad inventory*. Available at: <https://mediatel.co.uk/newsline/2016/10/04/where-did-the-money-go-guardian-buys-its-own-ad-inventory/> [Accessed on 19 Nov 2017]

6.1.2.2 Scenario 1: Programmatic indirect – open exchange

The programmatic indirect trading model is the least favourable for publishers in terms of the share of advertiser investment that they receive. SSPs and DSPs take a high share of spend relative to other scenarios in order to facilitate an open auction. The cost of targeting data is also relatively high because publishers reveal limited data about impressions for sale in open auctions - buyers apply their own data, some of which may be purchased.

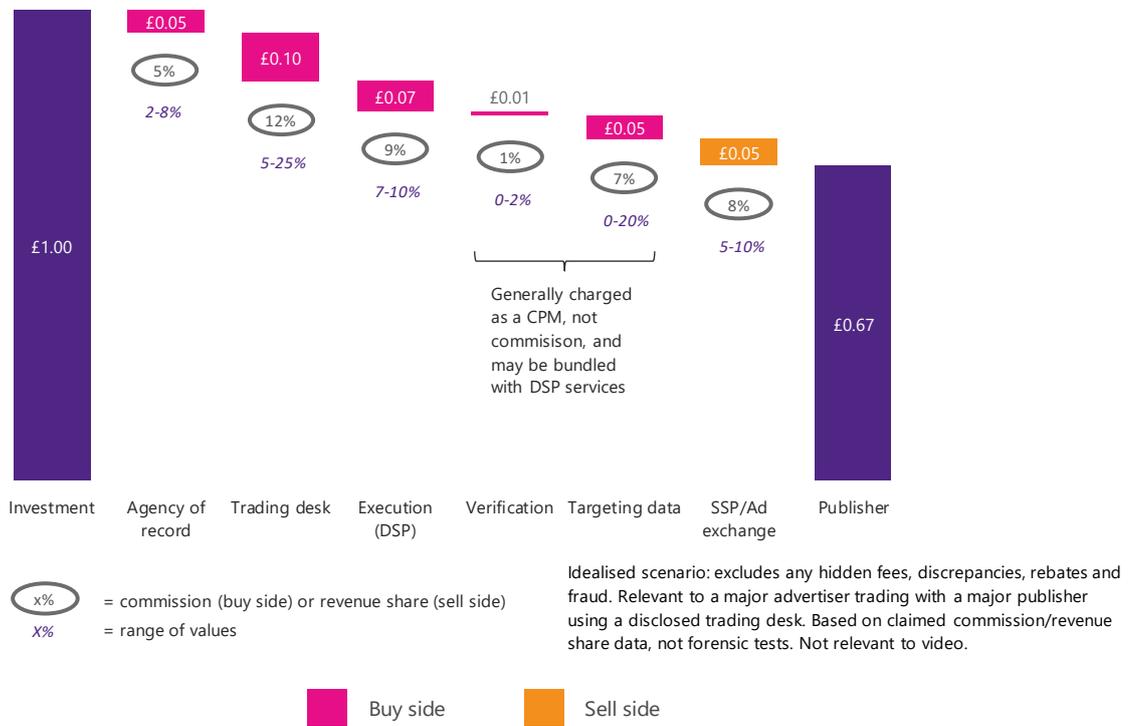
Figure 6.4: Share of advertiser investment – programmatic indirect (open exchange) sales of display ads - UK



6.1.2.3 Scenario 2: Programmatic direct – private marketplace

The private marketplace trading model involves similar fees to programmatic indirect (scenario 1) except SSP fees are lower due to the lack of an open auction.

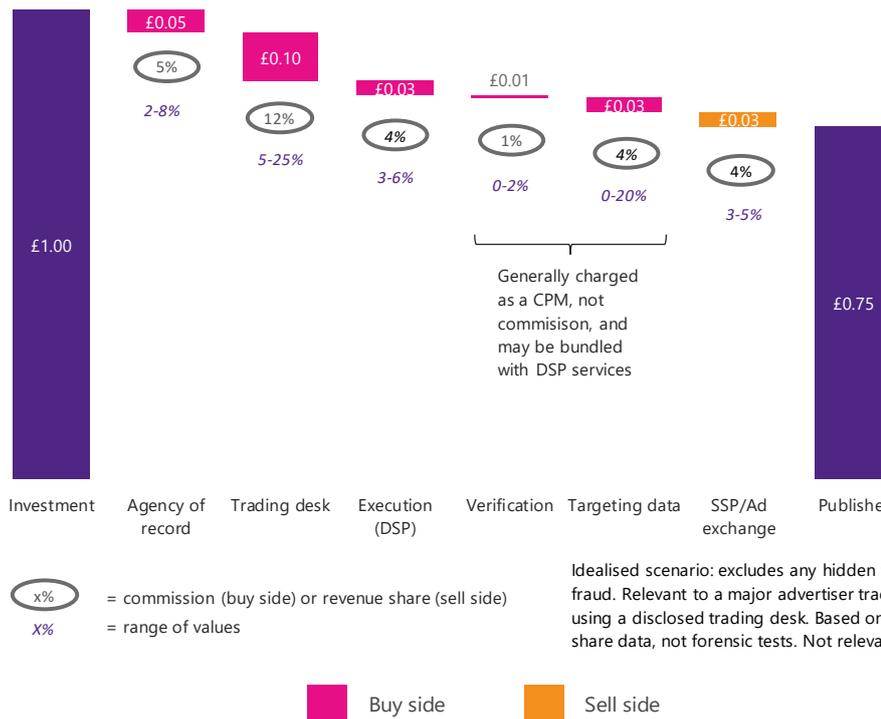
Figure 6.5: Share of advertiser investment – programmatic private marketplace sales of display ads - UK



6.1.2.4 Scenario 3: Programmatic direct – programmatic guaranteed deal

In this scenario, the agency buys from the publisher using an insertion order for a certain amount of inventory at a fixed price. Programmatic intermediaries automate this transaction and fulfilment, but do not facilitate an auction or bidding. Consequently, SSP and DSP costs are relatively low. There is limited need for targeting data in this model given that the deal is pre-agreed and, in some cases, the publisher provides segmentations direct to the buyer.

Figure 6.6: Share of advertiser investment – programmatic direct sales via a guaranteed deal - UK



Idealised scenario: excludes any hidden fees, discrepancies, rebates and fraud. Relevant to a major advertiser trading with a major publisher using a disclosed trading desk. Based on claimed commission/revenue share data, not forensic tests. Not relevant to video.

6.1.2.5 Scenario 4: Internet platform direct sales

In this scenario, the internet platform (such as Facebook) sells directly to the agency and provides the publisher with a share of revenue. The supply chain is relatively clean, with the platform providing targeting as part of its service. The platform takes a relatively high share of revenue, but it may provide access to audiences that publishers would not otherwise have accessed, such as overseas audiences. Interviewees highlighted that they do not have audit rights to verify that the revenue they receive is in line with agreed revenue share.

Figure 6.7: Share of advertiser investment – internet platform sells on behalf of publisher – UK



6.2 Data flows

6.2.1 Overview

Data is the lifeblood of the online advertising industry, enabling brands to target advertising and to analyse campaign performance and impact. The online advertising market is increasingly divided between the “walled gardens” of major internet companies and the fragmented open internet:

- Major US internet companies collect multiple first-party datasets from large numbers of logged-in users. They operate data “walled gardens” - generally, they do not share data with third-parties, but do allow partners to import data onto their platforms for use in targeting or to measure attribution.
- In the open internet market, data collection and processing are fragmented across multiple different publishers and intermediaries. Developing a joined-up view of consumers across devices and browsers is difficult. Market participants work together to share data, but this creates challenges in terms of data leakage.

These two areas intersect where major US internet companies leverage their “walled garden” data in the open internet advertising market on owned and operated DSPs such as DV360 (Google) and Amazon DSP.

6.2.1.1 Types of data used in online advertising

Online advertising makes use of a wide range of data types, such as user data, device data, contextual data and campaign data. Data may be first-party (collected directly from consumers), second-party (first-party data shared directly with a partner) or third-party data (data sold on via an intermediary).

Figure 6.8: Main categories of data used in online advertising

Category	Type	Examples
User data	Demographic	Age, gender
	Interest	Declared interest in categories such as travel or cars
	Browsing	History of browsing on a publisher website
	Location	Mobile location data
	Intent	Recent searches for products or services
	Purchasing	Online and offline transactions
	CRM	Interactions with an advertiser website, call centre or stores
Device data	Device and browser	Desktop, laptop, tablet or mobile device operating system
	IP address	Home IP address
Contextual data	Content characteristics	Content category and keywords
	Ad format	Dimension of the ad unit
	Environment	Current weather
Campaign data	Ad serving data	Number of impressions served
	Bidding and price	Prices bid at auction

Although each data type has unique features, advertisers generally have a choice of different ways of using data to target an audience. For instance, an automotive manufacturer seeking to reach consumers in the market for a new car could use one or a combination of many approaches, such as:

- Search data – targeting users who have recently performed car-related searches.
- Publisher browsing data – targeting users who recently browsed car related web pages.
- Advertiser CRM data – targeting users who have previously visited the car manufacturer website.
- Lookalikes – targeting users with a similar demographic profile to the manufacturer’s existing customers.
- Lifestyle signals – targeting users who have recently moved home, had children or got a new job, based on social media data or third-party data.

Third-party data is widely used in programmatic advertising. In 2017, 84% of a sample of US programmatic advertising campaigns used data segments purchased from third-party data providers to enhance/improve targeting of media purchased programmatically. However, advertisers experienced diminishing returns after spending 5% of their budgets on third-party data¹²⁶.

Advertisers are making increasing use of first-party data which they collect from customer interactions and advertising campaigns. In some cases, they combine this data with second- or third-party data from partners or suppliers, and/or “walled garden” data.

Buy-side interviewees saw value in publishers that identify user interest in vertical markets, such as cars, travel or finance. However, they noted that, when available, the publisher’s data competes with other data sources which may provide a more powerful signal of user interest or intent.

6.2.1.2 Sources of data used in online advertising

As consumers browse the internet and use apps, they leave a data trail across the services they use. In addition, users generate data when they interact with certain offline businesses and this data may be made available for use in online advertising. There are four main sources of data in online advertising:

- Advertisers collect first-party data about their customers and prospective customers across a range of interactions, such as purchases, visits to publisher websites, and response to advertising campaigns.
- Publishers use tracking technologies, such as cookies, to collect first-party data about user browsing behaviour. In some cases, publishers gather data that users provide when they sign up for an account, subscribe to a newsletter, or take part in a competition.
- Internet companies such as Facebook, Google and Amazon collect a large number of first-party datasets from logged on users across devices and services. Facebook collects data including user content, communications, location, devices, networks of friends, contacts, usage, transactions on Facebook products, information provided by others on Facebook, as well as personal data provided at sign up¹²⁷. Google collects data including user devices, browsers, apps, search terms, video views, voice information, purchase activity, contacts, activity on third-party sites and apps that use Google services,

¹²⁶ Ebiquty/ANA/ ACA/AdFin -Programmatic: Seeing through the financial fog. An In-Market Analysis of Programmatic Media at the Transaction Level – May 2017

¹²⁷ Facebook. (2018). *Data Policy*. Available at: <https://www.facebook.com/policy.php> [Accessed on 17 Nov 2018]

Chrome browsing history (in certain cases), location and personal data, such as name, phone number and email address¹²⁸.

- Specialist data providers collect and process data from a range of online and offline sources and resell this third-party data to participants in the programmatic advertising market.

Facebook, Google and Amazon have the important advantage of logged on users on many of their services¹²⁹. This logon data allows them to identify users, based on registration data, across devices and browsers. Facebook, Google and Amazon also have the advantage of high reach across the UK population and deep user data across multiple categories.

Google and Facebook collect data for users who have consented insofar as they have agreed to the platform's terms and conditions and not opted out of certain data collection or use, such as face recognition. The Italian Competition Authority found that Facebook *'misleads consumers into registering in the Facebook platform, while not adequately and immediately informing them during the creation of the account that the data they provide will be used for commercial purposes.'* and that *'The information provided is in fact general and incomplete and does not adequately make a distinction between the use of data to personalize the service (in order to connect "consumer" users with each other) and the use of data to carry out advertising campaigns aimed at specific targets.'*¹³⁰

Publishers also have logon data, if they require registration or subscription. However, in many cases they track users with only cookies and face challenges following users across different device and browser environments. Publisher data is less deep and joined up than data available to Facebook, Google and Amazon.

6.2.1.3 Data quality

Importantly, the quality of data in programmatic advertising is variable. Deterministic data, such as data provided by consumers on forms, may be in error if family members share devices and logons, or consumers lie when they fill in forms. Probabilistic data, inferred from user behaviour, is inherently error prone as it may be based on incorrect assumptions or inferences. All data may quickly become out of date. Interviewees suggested that third-party data is generally less reliable than advertiser first-party data and quality can vary between data providers. There is limited information about the quality of third-party data, but research indicates that there is a high level of error: in one case, about a third of the time two third-party data providers disagreed on what gender an individual was¹³¹. The data walled gardens generally have higher quality data than third-party data providers, but they are susceptible to error due to shared device usage and users lying about their age when they sign up.

Consequently, audience targeting is imperfect. In the UK in 2016, although 91% of digital advertising targeted at over 18-year-olds reached this audience, only 50% of advertising aimed at over 18-year-old females was on target¹³². One agency interviewee explained that clients that need to avoid certain groups, such as alcohol brands targeting only over-18-year olds, tend to pay a premium for higher quality data.

¹²⁸ Google Privacy and Terms. (2018). *Google Privacy Policy*. Available at: <https://policies.google.com/privacy?hl=en#infocollect> [Accessed on 18 Nov 2018]

¹²⁹ Facebook and Instagram users are logged on. Logon is required on some Google services, such as Gmail, but not YouTube or search.

¹³⁰ Autorità Garante della Concorrenza e del Mercato (2018). *Facebook fined 10 million Euros by the ICA for unfair commercial practices for using its subscribers' data for commercial purposes*. Available at: <http://en.agcm.it/en/media/press-releases/2018/12/Facebook-fined-10-million-Euros-by-the-ICA-for-unfair-commercial-practices-for-using-its-subscribers'-data-for-commercial-purposes> [Accessed on 18 Nov 2018]

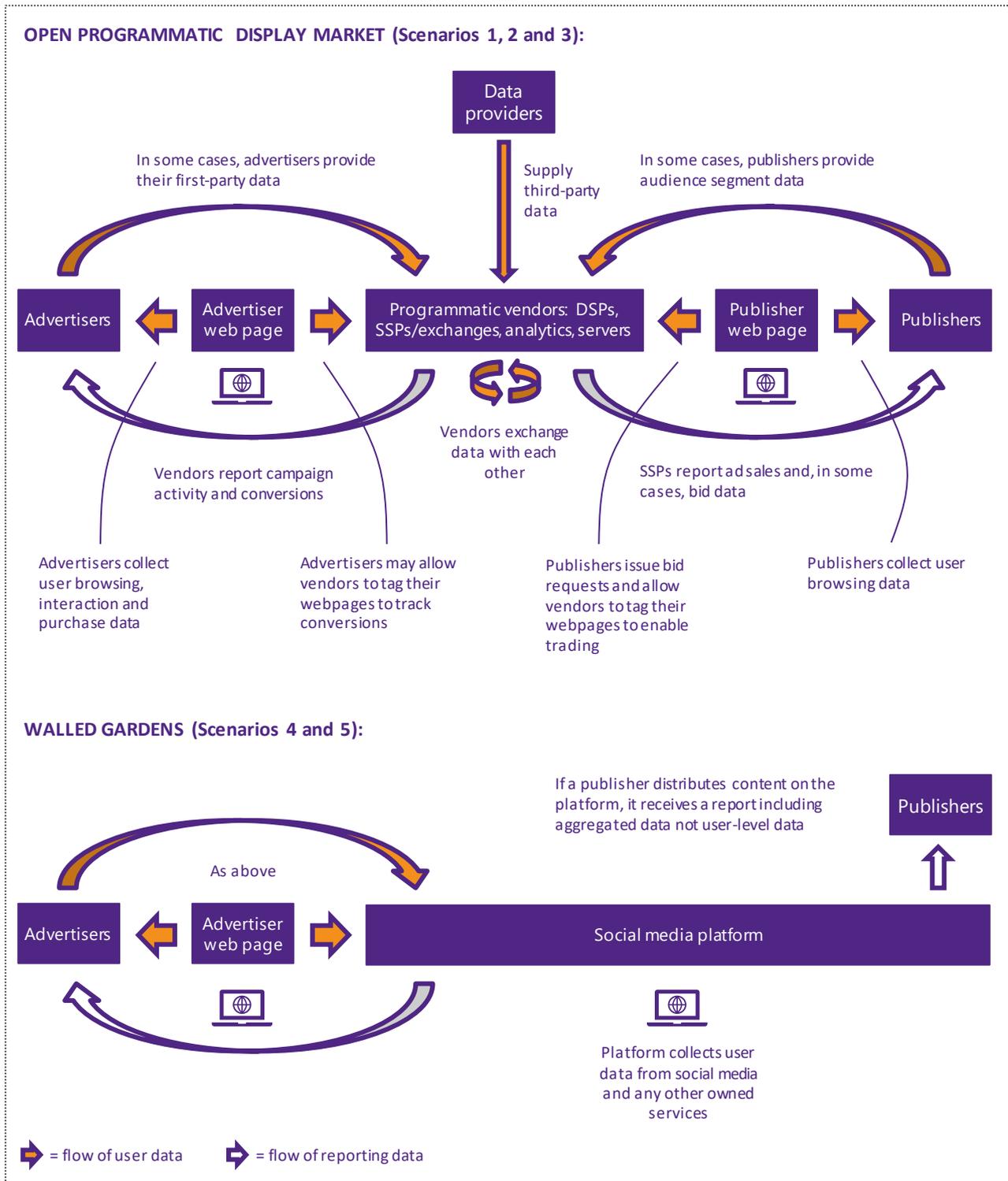
¹³¹ Benes, R. (2017). *Why is third-party data still often wrong?* Available at: <https://digiday.com/marketing/data-vendors-struggle-gender/> [Accessed on 18 Nov 2018]

¹³² The Nielsen Company. (2017). *Nielsen Digital Ad Ratings: Benchmarks and findings through 2H 2016, Europe*. Available at: <https://www.nielsen.com/content/dam/niensenglobal/eu/docs/reports/Nielsen-Digital-Ad-Ratings-Benchmarks-and-Findings-Report.pdf> [Accessed on 18 Nov 2018]

6.2.2 Data flows by scenario

The way that data is collected, processed, shared and used for online advertising differs between the open display market (scenarios 1 to 3) and social media platforms (scenarios 4 and 5). The open online display advertising supply chain is fragmented, and participants exchange data with each other in order for advertisers to understand users and to target advertising. In contrast, social media platforms own their supply chain from end to end and have a consistent view of the user throughout.

Figure 6.9: Data flows by scenario – highly simplified and generalised



In the programmatic market, publishers generally choose to disclose data to buyers in bid requests¹³³ and allow SSPs, DSPs and other market participants to collect user data from their web pages and ads – in order to maximise the price of their ad impressions. The disadvantage of this approach is “data leakage” from publishers to other market participants. In the case that publishers distribute on third-party platforms and allow these

¹³³ Bid requests are notices placed by into the real-time bidding system by SSP/ad exchanges to inform buyers about an impression that is for sale. The request generally includes data about the seller, ad unit, time and user.

platforms to sell ads, it is the platform not the publisher that provides data to buyers – the publisher receives limited reporting data.

Figure 6.10: Publisher exchanges of data in programmatic advertising

Scenario	What data do publishers provide to programmatic vendors?	What data do programmatic vendors collect from publisher pages?	What data does the publisher get back from partners?
1. Programmatic indirect – open exchange	Bid requests contain basic data about an ad such as IP address, browser, user ID and the publisher domain.	User IP address, page URL, contextual information, user actions.	The SSP reports ads sold and served and – in some cases – bid information.
2. Programmatic direct – private marketplace	As above, plus publisher audience segmentations are provided in some cases.	As above.	As above.
3. Programmatic direct – guaranteed deal	As above.	As above.	As above.
4. Distribution on a third-party internet platform	None	None	Aggregated data, such as a breakdown of traffic by demographic and revenue share.

6.2.2.1 Scenarios 1, 2 and 3: Open programmatic display advertising market

One of the main uses of data in programmatic advertising is to inform buying decisions. Many advertisers aim to target specific audiences and DSPs offer audience segments such as affinity (e.g. avid investors, dog lovers, beach-bound travellers) or in-market (e.g. baby and children's products, telecom¹³⁴). DSPs need to assess whether advertising impressions offered for sale match these audiences and segments. The programmatic advertising industry has developed complex systems for joining up data across the supply chain to give buyers information about impressions.

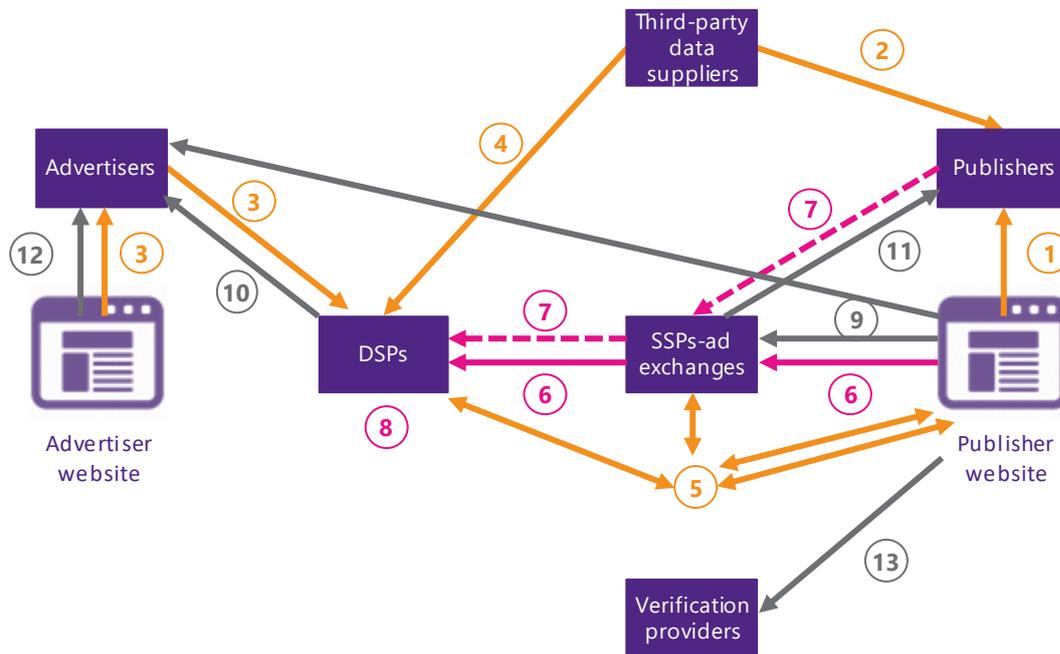
Programmatic advertising works with pseudonymous data in which there is an individual identifier (a user ID), with links to all personal data removed. Different participants in the programmatic supply chain create different IDs for the same user. In order to assess an impression, buyers need to match the user ID provided by the seller with user IDs on their own user databases through a process of ID synchronisation. Generally, synchronisation involves various market participants inserting computer code, known as pixels, into a user's web browser. Synchronisation is inefficient, with match rates often in the range 50% to 70%¹³⁵. User IDs are also fragmented across browsers and devices and additional matching is required across these platforms.

After advertising has been served, participants gather data about how the user responded, such as clicking on an ad or making a purchase. Figure 6.11 below shows a simplified description of the main points of data collection, matching and use in programmatic online advertising.

¹³⁴ More granular subcategories are also available.

¹³⁵ ID5. (2018). *Publishers' Guide to Programmatic Monetisation Post-GDPR*. Available at: *Publishers' Guide to Programmatic Monetisation Post-GDPR* [Accessed on 18 Nov 2018]

Figure 6.11: Data flows in the programmatic desktop display advertising value chain – simplified



- = key market participant
- = data flow – background data collection, processing and syncing
- = data flow – real-time bidding
- = data flow – ad delivery, conversion/attribution and verification

Background data collection, processing and syncing:

1. The publisher tracks user behaviour on its websites and apps. In some cases, the publisher also collects personal data such as age, gender and email addresses when users sign up for an account.
2. In some cases, the publisher matches its user data with third-party data in order to develop custom user segmentations.
3. The advertiser tracks user behaviour on its website and apps and collects CRM data and advertising campaign data (see 10, below). It may share some of this data with the DMP to enable the trading desk to target on this data.
4. The DSP aggregates data from third-party data providers or its own databases.
5. SSPs and DSPs conduct ID synchronisation, generally initiated after an SSP issues a bid request. Synchronisation uses SSP and DSP pixels¹³⁶ that the publisher chooses to allow on its website. As part of the synchronisation process, these pixels may report data such as the user IP address and the page URL.

Real-time bidding:

¹³⁶ A pixel is an invisible tag that resides on web pages which, when visited by a consumer, generates a notice of those visits.

6. When a user visits a website, the publisher SSP¹³⁷ issues a bid request to the marketplace including limited data about the advertising impression for sale, such as the user IP address, browser information, user cookie ID and the publisher domain, and in some cases the webpage URL. Bid requests do not include personally identifiable information – for instance, Google Ad Manager restricts sharing of this information¹³⁸ and deactivates publishers violating this rule. On an open ad exchange, the bid request is visible to all buy-side participants.
7. In the case of private marketplaces, the publisher may choose to disclose additional information about the impression, such as user segmentations.
8. DSPs attempt to match the bid request cookie ID with IDs on their own database or a third-party DMP. If there is a match, they will layer on user information from the database. They decide whether and how much to bid.

Ad delivery and attribution:

9. The SSP selects the winning bid and the advertising creative is served to the user. The advertising creative contains ad tags that report back to DSPs, SSPs and others, data such as the user IP address, URL and domain. This data is used to confirm delivery of the ad.
10. The advertiser obtains reporting data from the DSP. In the case of walled gardens, this is in aggregate form: DV360 enables advertisers/agencies to generate performance reports containing aggregate data, such as total number of impressions, cost and conversions¹³⁹, but it does not disclose user IDs following the implementation of GDPR.
11. The SSP reports back to the publisher, in some cases providing bid data.
12. Advertisers may tag their own webpages, such as an online retailer checkout page, with attribution tags that report back to ad tech or analytics companies which match this data with ad serving data to assess whether users exposed to ads went on to make a purchase or other desired action.

Verification:

13. Verification providers gather data using ad tags and webpage tags which report back data about the ad and/or the context, such as viewability metrics and key words on pages, as well as IP addresses and the domain.

Publishers receive a higher price for advertising impressions that buyers are able to identify. One interviewee claimed that there is a 3-4 times price premium for identified impressions compared to non-identified impressions. Others claim a premium of 2-3 times¹⁴⁰. Consequently, publishers have an incentive to include user IDs in bid requests and to allow demand partners to place third-party cookies on their websites to enable ID synchronisation.

Publisher “data leakage” is a consequence of distributing bid requests and involves DSPs gleaning data from ad exchanges¹⁴¹. DSPs are able to see data in publisher bid requests even if they do not bid and could use this data for subsequent user targeting, potentially collecting data across multiple bid requests per user and building up a detailed picture of the user. In addition, data leakage occurs from ad tags and website tags that publishers allow ad tech vendors to place on their web pages. Publishers generally do not have visibility about how ad tech

¹³⁷ Or in the case of header bidding, the user browser or app.

¹³⁸ See: <https://support.google.com/admanager/answer/7686480?hl=en>

¹³⁹ See: <https://support.google.com/displayvideo/table/3187025>

¹⁴⁰ ID5. (2018). *Publishers' Guide to Programmatic Monetisation Post-GDPR*. Available at: <https://www.id5.io/whitepaper> [Accessed on 18 Nov 2018]

¹⁴¹ BOKonAds. (2017). *Data is fallout, not oil*. Available at: <https://bokonads.com/data-is-fallout-not-oil/> [Accessed on 19 Nov 2018]

vendors use data collected from bid requests and tags. With respect to GDPR, pass-through of data to DSPs is covered by the IAB Transparency and Consent Framework (see Section 6.2.3).

In 2018, the Guardian, The Telegraph, News UK and Reach launched Ozone, a joint project to develop common audience segmentations and provide more control over data¹⁴². Ozone is creating a server-side container, a technology solution that would limit third-party cookies on publisher sites.

6.2.2.2 Scenario 4: Distribution on third-party internet platform

When publishers distribute content on third-party “walled garden” internet platforms and allow the platform to sell advertising, the platform collects browsing/usage data in relation to the content, as it does with any content on its platform. It uses this data and other user data to offer targeting options to advertisers and agencies – these options are presented as user segments in aggregate, without revealing user IDs. The platform reports audience data and advertising sales data back to the publisher in aggregate form, without revealing user IDs. This data may include fill rates¹⁴³, CPMs and interaction rates. Individual user data is not shared with publishers.

6.2.2.3 Scenario 5: Social media or search platform

Facebook, Google and Amazon collect multiple datasets across their services, including consumer services and advertising technology services. They leverage this data to provide buyers of their advertising with granular targeting options and tools such as frequency capping¹⁴⁴.

Google Ads offers targeting based on keywords, demographics, remarketing, interests (such as music lovers, technophiles and outdoor enthusiasts) and in-market audiences (such as consumer electronics audio)¹⁴⁵. Facebook provides targeting on demographics (such as age, gender and relationship status such as recently engaged or married) and a multitude of detailed segments (such as people interested in vegan recipes or people who returned from travelling within the past week)¹⁴⁶. Advertisers are able to see these segmentations on buying platforms, but not the underlying user data which remains within the platform “walled garden”.

In contrast, Snapchat is more restrained with its use of user data - it does not use user social graph data for targeting. It makes inferences from demographic and usage data to create lifestyle categories, and offers location targeting – for opted in users.

GFA own the supply chain from services through to advertising sales. They do not need to allow third-parties to gather data from their websites and apps in order to provide buyers with targeting options. In addition, GFA do not provide agencies and advertisers with user IDs when they report campaign data – in order to prevent data leakage. Consequently, advertisers and agencies need to import their data onto GFA data platforms in order to measure conversions and attribution. Google provides Ads Data Hub¹⁴⁷ for this purpose, but advertiser data is segregated from data that Google collects for use in advertising.

¹⁴² Davies, J. (2018). *Top UK publishers have a new alliance to compete with the duopoly*. DigidayUK. Available at: <https://digiday.com/media/alliance-publishers-uk-compete-duopoly/> [Accessed on 18 Nov 2018]

¹⁴³ Fill rate is the proportion of ad impressions that are sold.

¹⁴⁴ Frequency capping is placing a limit on the number of times that a user sees a given ad.

¹⁴⁵ Google Ads. (2018). *Display Campaigns. Reach more people in more places online*. https://ads.google.com/intl/en_uk/home/how-it-works/display-ads/ [Accessed on 17 Nov 2018]

¹⁴⁶ Facebook Ads Manager [Accessed on 3rd December 2018].

¹⁴⁷ Ads Data Hub. (2018). *Introduction- How Ads Data Hub works*. Available at: <https://developers.google.com/ads-data-hub/guides/intro> [Accessed on 18 Nov 2018]

6.2.3 The General Data Protection Regulation (GDPR)

The General Data Protection Regulation (GDPR) is a set of rules aimed at providing EU citizens with greater control over how their personal data is collected and used. It requires a lawful basis for data processing, such as clear consent from the individual to process their personal data¹⁴⁸. GDPR was implemented on 25th May 2018.

Generally, online advertising market participants have put in place GDPR compliance measures. IAB Europe has developed a Transparency and Consent Framework to provide guidance on these measures¹⁴⁹. Using the Framework, first-parties (such as publishers) can enable third parties (such as SSPs) to process user data on one of the legal bases of the Regulation¹⁵⁰. The Framework includes standardised approaches to obtain informed consent to process user data, and pass information relating to these consents to the supply chain. Participants in the open display advertising market have generally adopted these approaches which underpin sharing of user IDs.

On the basis of these compliance measures, the use of user data in online advertising has continued. However, some interviewees reported decreased availability of third-party data and lower rates of cookie matching since GDPR implementation – making it more difficult to leverage user data in the open display advertising market. In part, decreased cookie match rates may be due to certain publishers limiting the number of vendors they seek consent for: ft.com requests consent for only 12 vendors¹⁵¹ compared to thetimes.co.uk which seeks consent for over 150 vendors¹⁵².

Looking ahead, some interviewees were uncertain whether the IAB Framework is sustainable, given recent regulatory opinions. On 9 November 2018, the French data protection authority, Commission nationale de l'informatique et des libertés, issued a warning that might undermine the current system of consent pass through¹⁵³.

Many interviewees believe that, given the challenges it creates in the open display market, GDPR has unintentionally strengthened Google and Facebook. These companies are able request consent and apply this across their end-to-end supply chain.

In addition, Google and Facebook GDPR compliance measures have stopped third-party access to user IDs. Prior to this development, advertisers/agencies were able to extract user ID data from Google and Facebook buying platforms for purposes such as assessing overlap between impressions bought on Google, Facebook and other internet media, and modelling attribution. Now, it is challenging for advertisers/agencies to conduct their own assessment of this overlap. Some experts believe that these measures were designed to strengthen the walled gardens.

6.2.4 The e-Privacy Regulation

The ePrivacy Directive¹⁵⁴ is an EU directive primarily regulating the processing of personal data in the electronic communications sector. It includes rules on storing and accessing data on a user's device, such as internet cookies. The ePrivacy Directive stipulates that member states must create rules that require website operators to

¹⁴⁸ Information Commissioner's Office (ICO). (2018). *Guide to the General Data Protection Regulation (GDPR)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/711097/guide-to-the-general-data-protection-regulation-gdpr-1-0.pdf [Accessed on 18 Nov 2018]

¹⁴⁹ IAB Europe. (2018). *Transparency, Control and Choice*. Available at: <https://advertisingconsent.eu> [Accessed on 19 Nov 2018]

¹⁵⁰ Under GDPR, consent is only one of six "legal grounds" for processing personal data.

¹⁵¹ Financial Times. (2018). *Manage Cookies*. Available at: <https://www.ft.com/preferences/manage-cookies> [Accessed on 30 Nov 2018]

¹⁵² The Times. (2018). Available at: <https://www.thetimes.co.uk/> [Accessed on 30 Nov 2018]

¹⁵³ Schiff A. (2018). *the IAB's Consent Framework in Trouble?* Ad Exchanger. Available at: <https://adexchanger.com/ad-exchange-news/is-the-iabs-consent-framework-in-trouble/>

¹⁵⁴ European Union (2002), *Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector Directive 2002/58/EC*. Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32002L0058> [Accessed on 14 Dec 2018]

inform the user concerned about the use of cookies and obtain their consent for the use of (most) cookies. The UK chose to transpose the Directive in a way that avoided introducing an opt-in regime for cookies¹⁵⁵.

On 10 January 2017, the European Commission proposed repealing and replacing the Directive with an ePrivacy Regulation. As a matter of EU law, Regulations can be relied upon directly by citizens, meaning that EU Member States do not have a role in interpreting their application. In its current form, the Regulation would require the consent of users in line with the rules of the General Data Protection Regulation for the lawful use of cookies and other advertising identifiers¹⁵⁶, to collect information (not just personal data) and to deliver targeted advertising¹⁵⁷.

The proposed Regulation would also mandate browsers and other software to provide the option to actively prevent data collection through cookies and other identifiers, and to force users to make a choice as to their preference during set up. This would be the case not just for web browsers, but for any application or device which can connect to the internet. IAB Europe claims that the proposed Regulation would “*undeniably damage the advertising business model – without achieving any real benefits for users from a privacy and data protection point of view.*”¹⁵⁸

The Regulation is under negotiation between the European Parliament and the Member State governments in the Council of the European Union. It is likely that amendments will be made, but it is currently uncertain what these amendments will be, when the Regulation will be finalised and what impact it will have on online advertising.

6.3 Ad flows and control points

After an ad is sold, the ad creative (the content of the ad) flows from the advertiser/agency ad server to the user. The online advertising industry has put in place numerous policies and procedures to quality assure ads and publishers involved in these flows, and to prevent fraud. The first line of defence is generally automated, given the need to check large volumes of ads and publishers – especially in the case of self-service platforms that enable small-scale advertisers and publishers to participate.

6.3.1 Open programmatic display market

In the open programmatic display market (scenarios 1, 2 and 3), participants generally have policies and procedures in place to assure the quality of advertising creative (the content of advertising), publishers and content, and to ensure viewability, brand safety and non-fraudulent traffic. These policies and procedures differ by competitor. We have not reviewed or audited practices across the market¹⁵⁹, so we present a generalised overview and examples.

¹⁵⁵ Internet Advertising Bureau (IAB) UK (2014). *Factsheet: EU ePrivacy Directive*. Available at: <https://www.iabuk.com/sites/default/files/UPDATED%20IAB%20Factsheet%20Revised%20EU%20ePrivacy%20Directive%20-%20SEPTEMBER%202014.pdf> [Accessed on 14 Dec 2018]

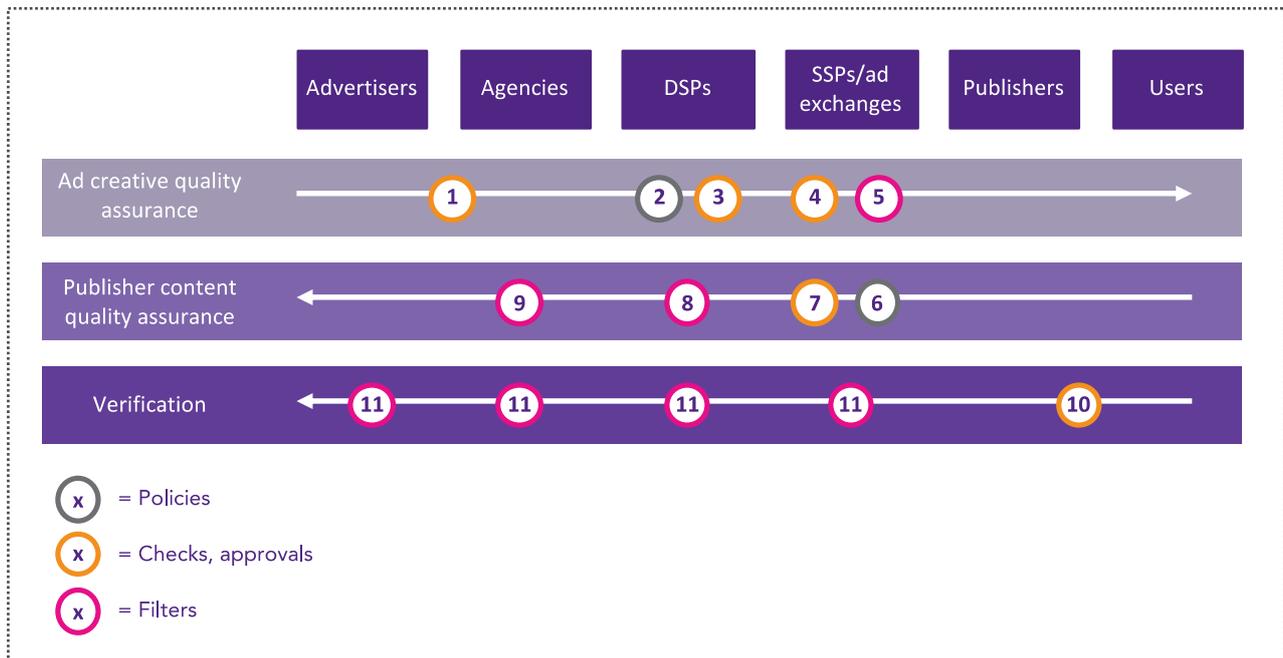
¹⁵⁶ Such as the such as the IDFA and AAID identifiers used on Apple and Android devices respectively.

¹⁵⁷ IAB Europe. *Privacy & Data Protection*. Available at <https://www.iabeurope.eu/category/policy/data-protection/> [Accessed on 14 Dec 2018]

¹⁵⁸ IAB Europe (2017). *Proposed ePrivacy Regulation Fails to Improve Cookie Rules*. Press release, 10 Jan 2017. Available at: <https://www.iabeurope.eu/policy/press-release-proposed-eprivacy-regulation-fails-to-improve-cookie-rules/> [Accessed on 14 Dec 2018]

¹⁵⁹ Due to limited capacity.

Figure 6.12: Quality assurance checks in the open programmatic display market – simplified and generalised



Advertising creative is generally distributed directly from a buy-side ad server (advertiser, agency or buying platform) to the user web browser or app, after an auction has been completed. There are several points along the trading path at which this content may be checked and categorised (in advance) or filtered to allow publishers to control what advertising creative is placed against their content and to weed out bad ads.

1. Advertisers and their agencies generally sign off on any creative before it is used for a campaign.
2. DSPs generally have policies to protect against bad ads. Google Ads policies prohibit certain content (e.g. counterfeit goods, dangerous products and services) and practices (e.g. irresponsible data collection), restrict certain content (e.g. adult content, alcohol, gambling, medicines) and set out editorial and technical guidelines¹⁶⁰.
3. Some DSPs conduct automated screens of ads for compliance with these policies¹⁶¹. Google uses automated screening, with escalation to human review for creative flagged up by automated screening. Mediamaath automatically scans and validates creative¹⁶².
4. In some cases, SSPs apply additional checks on creative. AppNexus manually reviews all creative against its own policies for buying¹⁶³. Rubicon Project manually reviews 'new unknown creative'¹⁶⁴. Google Ad Exchange reviews all new and changed ads¹⁶⁵. Some SSPs outsource quality assurance to The Media Trust¹⁶⁶.
5. SSPs generally offer publishers the ability to block certain advertisers, brands or categories of ad. Google publisher controls enable blocks on categories such as significant skin exposure, get rich quick,

¹⁶⁰ See <https://support.google.com/adspolicy/answer/6008942> [Accessed on 27 Nov 2018]

¹⁶¹ DSPs do not provide publish detail about how automated screens work, but we believe that they involve use of computer algorithms or artificial intelligence to scan ad headlines, descriptions, keywords, images and/or video for potential infringement of policies.

¹⁶² <http://www.mediamath.com/media/creative-management/>

¹⁶³ <https://wiki.appnexus.com/display/policies/Policies+for+Buying>

¹⁶⁴ <https://rubiconproject.com/protection/>

¹⁶⁵ <https://support.google.com/authorizedbuyers/answer/2561796?hl=en>

¹⁶⁶ <https://mediatrust.com/how-we-help/creative-website-qa>

religion and weight loss. SSPs may also offer blocks on DSPs and DSP seats¹⁶⁷ - such as barring a buyer following an incident of bad ads.

Users, publishers and authorities are able to report any bad ads that escape these controls. Publishers and content are generally checked and categorised by SSPs, and in some cases DSPs, allowing advertisers to control what content their ads are placed against and to weed out bad publisher content.

6. SSPs generally have policies to protect against bad publishers and content. OpenX bans sites featuring certain content (e.g. online gambling, copyright infringement, extreme violence), limits sites in restricted categories (e.g. adult humour, sale of prescription drugs) and will not work with sites of no value (e.g. boilerplate text)¹⁶⁸.
7. SSPs generally screen sites for compliance with these policies – these screens may be automated or manual. OpenX conducts domain reviews of publishers¹⁶⁹. Some SSP also use proprietary systems to scan publisher traffic for fraud.
8. DSPs generally offer targeting options that allow advertisers to block ad placement in certain classifications of content. Google uses proprietary technology to classify content and allows users of DV360 to filter ad inventory and/or block certain sensitive content categories¹⁷⁰.
9. Some advertisers and agencies buy against white lists of approved publishers and exchanges, whilst some others use black listing.

Participants across the value chain use third-party verification providers to provide additional protection against fraud and to ensure viewability and brand safety.

10. These providers check publisher traffic, websites and ad placements.
11. Buyers use tools offered by verification providers to filter out unsuitable ad impressions.

Despite these policies and procedures, interviewees noted that some bad ads, bad content and fraud slip through the net (elaborated on in Section 7). Automated screens, such as using computer algorithms to identify content that infringes policies - are not failsafe, especially in the case of video content in which it is difficult to spot unsuitable content. Verification lacks standardisation and, in some cases, is based on a sampling approach.

6.3.2 Social media and search platforms

Social media and search platforms (Scenarios 4 and 5) generally conduct checks on ads and advertisers involving automated screens and human escalation. Facebook advertisers need to have a Facebook account in order to place ads. Facebook has advertising policies¹⁷¹ that prohibit certain content (e.g. illegal products, discriminatory practices, tobacco products, and weapons), restrict certain content (e.g. alcohol, dating, gambling) and restrict targeting practices (e.g. discrimination against users, predatory advertising). Facebook uses automated screening involving artificial intelligence to check compliance with these policies, with escalation to human review. Google Ads takes a similar approach, as noted above. Snapchat conducts manual checks on ads before these ads are served.

¹⁶⁷ A DSP seat is an individual DSP user – SSPs might block a DSP seat if the user is in violation of policies.

¹⁶⁸ <https://www.openx.com/legal/ad-exchange-supply-policies/>

¹⁶⁹ <https://docs.openx.com/Content/publishers/traffic-quality.html>

¹⁷⁰ <https://support.google.com/displayvideo/answer/3032915?hl=en>

¹⁷¹ <https://www.facebook.com/policies/ads>

In the case of social media, platforms exercise some control over the contexts or content in which advertising is placed. Facebook places advertising in user news feeds, but not in Facebook Groups. YouTube places advertising only against the videos of certain creators, generally creators with large numbers of video views or followers.

The challenge for social media platforms is the large volume of user-generated content that advertising might be placed against or adjacent to. Facebook has Community Standards setting out what is and is not allowed on Facebook, covering areas such as violence and criminal behaviour, safety, objectionable content, integrity and authenticity and respecting intellectual property. Facebook uses technology and manual review to enforce these standards.

In scenario 4 (publishers distributing content on social media platforms), advertising sold by the social media platform is subject to the same checks as advertising placed on its own platform.

7 Assessment of potential harms

The growth and complexity of the online advertising market has generated policy and regulatory debate in the UK and overseas. This debate has included consideration of the various harms that could potentially materialise as a result of the structure and operation of the sector. In this section we outline these potential harms and consider the scope and scale of each issue.

We categorise the potential harms into three broad categories:

- **Individual harms**, referring to potential impacts on individual firms and consumers;
- **Societal harms**, referring to practices which may be detrimental to society as a whole; and
- **Economic harms**, referring to potential harms that may arise from lack of competition or inefficiencies within the sector.

This classification is imperfect, as the categories are likely to be interrelated to a significant extent. For example, a strongly competitive market in display advertising intermediation may help reduce the problem of advertising fraud, as intermediaries might compete on the strength of their vetting and verification services. Nevertheless, it forms a framework with which to analyse potential harms.

Note that this report is not an assessment of competition in the market, nor does it offer policy recommendations. Rather, it is intended to indicate areas of potential concern for future investigation, if deemed necessary.

7.1 Potential individual harms

7.1.1 Digital advertising fraud

Digital advertising fraud refers to a range of practices used to misrepresent advertising impressions, clicks or conversions in order to generate revenue from advertisers.¹⁷² As a result of this misrepresentation, advertisers do not get the exposure they are paying for, and publishers do not see revenue that would otherwise have accrued to them.

Advertising fraud is often facilitated using 'botnets' – networks of thousands or millions of Internet-connected devices infected with malware and under the remote control of an attacker.¹⁷³ These compromised devices run 'bots': software applications that run automated tasks over the Internet. Botnets can be used for a variety of harmful activities,¹⁷⁴ but in the case of advertising fraud, bots are usually used to visit web pages to increase page traffic ('non-human traffic') and to click on or 'view' ads. Figure 7.1 lists some of the more common methods used in perpetrating advertising fraud.

Ad fraud is most prevalent in programmatic display advertising, and in particular programmatic indirect display advertising. This route to market offers a number of ways for nefarious actors to enter the ecosystem and

¹⁷² In this context the term 'fraud' is not intended to represent fraud as defined in UK law; rather it represents a custom definition strictly for advertising measurement purposes.

¹⁷³ ENISA (2017). *Threat Landscape Report 2017*. Available at: <https://www.enisa.europa.eu/publications/enisa-threat-landscape-report-2017> [Accessed on 5 Dec 2018]

¹⁷⁴ For example, distributed denial-of-service (DDoS) attacks, used to take websites offline.

monetise their activity. It is worth noting, however, that programmatic indirect only comprises about 20% of total display expenditure in the UK (around £840m in 2017).

Figure 7.1: Common methods of perpetrating advertising fraud¹⁷⁵

Type		Summary
Impression fraud	Hidden impressions/ad stacking	Display advertising that is not actually viewable – for example small (1x1 pixel) display ads, or ads stacked on top of one another – which are sold as if they are genuine impressions
	Video ad fraud	Video ad inventory that is non-viewable – for example, small (1x1 pixel) or played in the background
	Fake sites	Sites created with little or no content, purely to create space for adverts (often used in conjunction with fake traffic to generate revenue)
Traffic and user activity fraud	Fake ad traffic	Fake traffic (usually bot traffic), used to create false advertising impressions
	Fake ad clicks and interactions	Bot interaction with ads, such as clicking ads or playing video
	Re-targeting fraud	The use of bots to mimic specific high-value behaviour to increase the value of their clicks to advertisers
	Conversion fraud	The use of bots (or paid users) to fill out online forms and surveys in return for payment
Ad injection		Malware on the user's web browser surreptitiously inserts ads in webpages – for example, on top of the original ads – without getting the permission of the publisher. The ad inventory is listed on programmatic ad exchanges as being on that publisher's site.
Domain spoofing	Website impersonation	Malware installed on a users' device injects ad windows into webpages (see Ad injection). Fraudsters can then spoof the URLs of those ad windows to make them appear as though they are the sites of premium publishers. The inventory on these sites is then listed as genuine on programmatic ad exchanges.
	Tag editing	Fraudsters can modify the advertising tags that identify the domain a user is viewing, allowing them to impersonate quality publishers' sites to increase the price of advertising.
CMS fraud		Hacking into a publisher's Content Management System (CMS) to create false pages on legitimate domains. These pages purport to be part of a premium site.
Affiliate (CPA) ad fraud (cookie stuffing)		The process of inserting fake cookies on a consumer's browser to make it appear as though they have been referred from an affiliate website.

¹⁷⁵ Partly based on the IAB's Anti-Fraud Principles and Taxonomy (available at: https://www.iab.com/wp-content/uploads/2015/05/IAB_Anti_Fraud_Principles_and_Taxonomy.pdf) and FIPP's digital ad fraud taxonomy, (available at <https://www.fipp.com/news/insightnews/what-are-the-nine-types-of-digital-ad-fraud>)

Type		Summary
Search fraud		Fraudsters create websites and fill them with high value search 'keywords'. Brands advertising against those keywords buy inventory on these fake sites.
Influencer fraud	Fake followers	The use of services which generate fake followers on Snapchat, Facebook, YouTube or Instagram, to increase the value of the influencer to marketers
	Fake engagement	The use of services which fake user engagement with an influencer's account, to increase the value of that influencer to marketers.

Often, fraudsters will use several techniques in conducting advertising fraud. A common model is to create fraudulent webpages (often impersonating premium publishers' websites), host display advertising on those pages and use bots to 'view' those ads. This was the model employed by the Methbot and 3ve botnets, until they were shut down by authorities in the US.¹⁷⁶ With digital advertising, nefarious actors can be based anywhere in the world, often beyond the reach of UK law enforcement.

The prevalence of fraud is hard to measure, as some fraud goes undetected and fraud prevention systems can throw up false positives. In consequence, estimates of the overall scale of ad fraud vary widely. The cybersecurity firm White Ops has estimated that, in 2016/17, fraud losses amounted to 9% of desktop display spending, and 22% of desktop video display spending (higher CPMs for desktop video and strong demand for video inventory make this market a key target for fraud).¹⁷⁷ Applying these proportions to the UK non-social display market, implies that ad fraud could amount to losses of around £174m per annum.¹⁷⁸

By contrast, the WFA has suggested that ad fraud may have led total losses of \$45bn in 2016, and that this figure is likely to grow. Adobe inspected traffic across thousands of client sites and found 28% of the traffic was likely to be fraudulent.¹⁷⁹ Juniper Research calculated that ad fraud will cost advertisers globally a total of \$19bn in 2018.¹⁸⁰ Confiant, a verification firm, estimates that 0.5% of all programmatic impressions were fraudulent or malicious (i.e. contain malware).¹⁸¹

In the UK, News UK conducted an investigation into domain spoofing of its new brands, and estimated that marketers are wasting £700,000 per month on spoofed inventory.¹⁸²

Given the potential scale of the ad fraud problem, players throughout the value chain have adopted various fraud prevention procedures. These include whitelists of advertisers and/or SSPs/ad exchanges, credit checks on advertisers, automated and manual checks on advertisers' identity, blacklists of certain domains and advertising categories, and audit to detect fraudulent traffic. Many firms in the industry also employ third-party ad verification services, such as Integral Ad Science (IAS), MOAT and White Ops. Some intermediaries also offer their own verification services.

¹⁷⁶ United States Department of Justice (2018), *Two International Cybercriminal Rings Dismantled and Eight Defendants Indicted for Causing Tens of Millions of Dollars in Losses in Digital Advertising Fraud*. Press release, 27 Nov 2018. Available at: <https://www.justice.gov/usao-edny/pr/two-international-cybercriminal-rings-dismantled-and-eight-defendants-indicted-causing> [Accessed on 5 Dec 2018]

¹⁷⁷ WFA & The Advertising Fraud Council (2016). *Compendium of ad fraud knowledge for media investors*. Available at: <https://www.wfanet.org/adfraud> [Accessed on 4 Dec 2018]

¹⁷⁸ This figure is based on estimates of the size of the non-social display and video markets, excluding direct-sold broadcaster video-on-demand

¹⁷⁹ Greiner, A (2018). *Reality Check: Is Ad Fraud Up or Down?*. Available at: <https://www.forbes.com/sites/forbesagencycouncil/2018/07/26/reality-check-is-ad-fraud-up-or-down/#> [Accessed on 5 Dec 2018]

¹⁸⁰ Bundeskartellamt (2018). *Online advertising*. Series of papers on "Competition and Consumer Protection in the Digital Economy". Available at: https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Schriftenreihe_Digitales_III.pdf?__blob=publicationFile&v=5 [Accessed on 27 Nov 2018]

¹⁸¹ Confiant (2018). *Ad Quality Report Q2 2018*. Available at: <https://www.confiant.com/quality-report> [Accessed on 5 Dec 2018]

¹⁸² Davies, J (2018). *News UK finds high levels of domain spoofing to the tune of \$1 million a month in lost revenue*. Available at: <https://digiday.com/media/news-uk-tests-finds-high-levels-domain-spoofing-tune-1m-month-lost-revenue/> [Accessed on 5 Dec 2018]

Such measures can help contain ad fraud: IAS estimated that desktop display fraud rates were 0.7% for campaigns that employed fraud mitigation measures, compared to 10% for those that did not.¹⁸³ However, despite these efforts, there are points of vulnerability in the display advertising supply chain which still may allow the entry of fraudulent activity:

- The 'long tail' of ad exchanges. There are a large number of exchanges, including many smaller companies and exchanges based in other countries. Some are legitimate exchanges that might lack the resources to run comprehensive verification procedures; others may be fronts for ad fraud operations.
- Interrelationships between exchanges. Exchanges feed into one another and trade inventory; the same inventory may be traded through multiple exchanges. However, exchanges may not have the capacity to run verification checks on each other's inventory.
- Verification checks and procedures, and third-party verification services, are not infallible and may miss some fraudulent activity. Some interview respondents stated that it was possible to buy fraudulent traffic that can bypass well-known verification services.

Our research did not find a clear consensus about the future of advertising fraud. Some respondents likened ad fraud to a digital "arms race" between fraudsters and verification services, with bots increasingly capable of mimicking human behaviour to evade detection.¹⁸⁴ Anecdotally, fraudulent activity is moving towards video display and in-app display advertising, where the rewards may be greater and monitoring and verification is more challenging.¹⁸⁵

Other respondents suggested that the evolution of industry initiatives – such as ads.txt¹⁸⁶ and JICWEBS – had the potential to lower the incidence of digital ad fraud. ads.txt verifies that an exchange selling a publisher's impression is authorised to do so – which helps cut domain spoofing. Some advertisers and agencies also employ a 'whitelisting' model – restricting the number of publishers and SSPs that they use in order to improve quality and reduce fraud. Further in the future, the use of blockchain technology in advertising may also help to improve transparency and help prevent fraud.¹⁸⁷ The efficacy of industry-agreed measures is, however, somewhat hindered by uneven adoption and implementation across the industry.

Part of the challenge is that there are periods where demand for display advertising space exceeds the supply of quality inventory. This pushes advertisers to buying from the 'long tail' of smaller publishers and exchanges, where verification checks are likely to be less rigorous (in any case, such checks are not 100% infallible). While this enables smaller publishers to monetise their content, it increases the risk of fraudulent activity (and the brand safety risk) and provides an avenue for fraudsters to enter the system.

7.1.2 Damage to brand reputation

An advertiser's brand and reputation may be harmed if their advert appears alongside content which is illegal, immoral or inappropriate. This is of particular concern in digital advertising, where – with programmatic display automation – brands do not always know where their ads will appear, and are concerned about their advertising potentially funding illegal content.

¹⁸³ Integral Ad Science (2018). *Media Quality Report H1 2018*. Available at: <https://go.integralads.com/mqr-2018-h1.html> [Accessed on 5 Dec 2018]

¹⁸⁴ For example, bots involved in the 'Methbot' operation were able to move the cursor, scroll a page, pause and play a video and appear logged in to a social network. See White Ops (2016). *The Methbot Operation*.

¹⁸⁵ Third-party measurement and verification of in-app activity requires compliance from the app developer. As this activity may slow down the performance of the app, app developers may be reluctant to allow it.

¹⁸⁶ See <https://iabtechlab.com/ads-txt/> [Accessed on 5 Dec 2018]

¹⁸⁷ See <https://www.iab.com/blockchain/> [Accessed on 5 Dec 2018]

Advertisers tend to consider risk in terms of the proximity of their brand to the inappropriate content. In-stream video advertising is high risk because the ads appear in the content. The social platforms, especially YouTube, are where brands perceive most risk because of the vast amounts of user-generated content, some of which may be inappropriate (despite passing YouTube's automated verification procedures). However, Facebook is perceived as somewhat lower risk because ads appear in the same feed as content but are more distinct from the surrounding content.

A number of categories of content are generally regarded as inappropriate for and by most advertisers, including adult content, hate speech, terrorism, digital piracy, military conflict, illegal drugs, crime and fake news. This content includes both:

- inappropriate websites (for example, sites that facilitate online piracy) that have evaded verification procedures and sell advertising space on programmatic exchanges; and
- content on legitimate websites (for example, a news story about an unfolding terrorist attack on a news site).

In addition, many brands also have individual brand safety requirements – for example, airline brands will not want their advertising positioned near stories about air disasters. Brand safety is subjective, with different brands having varying degrees of caution depending on the image they aim to project.

Some respondents to our interviews offered the view that some advertisers are becoming increasingly wary about their brand appearing next to “hard news” topics (such as news stories about crime rates) or stories about controversial or divisive subjects (such as Brexit). One respondent noted that the number of excluded impressions jumped up on stories on sensitive topics. To the extent that this is the case, it may provide a disincentive to publishers to write “hard” news stories, as the expected returns are smaller (however, given that other respondents suggested that, in contrast, advertisers are becoming less sensitive over time, it is hard to gauge the extent to which this is an issue for publishers).

To minimise the risk that a brand will be exposed to inappropriate content, certain verification checks and processes can be implemented.¹⁸⁸ These measures can block ads appearing on certain sites and next to certain categories of content, as required. According to a survey of US marketers, blacklisting of specific sites and channels was employed by 66% of agencies and marketing firms.¹⁸⁹ Verification and categorisation of content is typically an automated process.

Whitelisting and blacklisting of specified keywords – either in the URL or within the content itself – is also used (though keyword blacklisting tends to be used only by the more cautious advertisers). Industry initiatives – such as JICWEBS¹⁹⁰ – can help to ensure inventory meets brand safety requirements.

Despite these measures, brand safety remains an issue: according to one estimate provided to us, around 4-10% of display advertising does not meet brand safety requirements. According to Integral AdScience, 4.5% of desktop display impressions were flagged as risky,¹⁹¹ with the majority classed as a “moderate” risk level (typically acceptable for all but the most risk-sensitive brands, content in this category might include, for example, partial nudity such as swimsuits).¹⁹²

Across all types of display, “very high” risk content (including graphic content and/or illegal content) made up less than 0.1% of total impressions.¹⁹³ This suggests that the risk of brands appearing next to offensive content is

¹⁸⁸ See Section 6.3 for further information on verification checks and procedures put in place in the online advertising industry.

¹⁸⁹ <https://www.emarketer.com/content/five-charts-explaining-the-state-of-brand-safety>

¹⁹⁰ See <https://jicwebs.org/standards/brand-safety/> [Accessed on 5 Dec 2018]

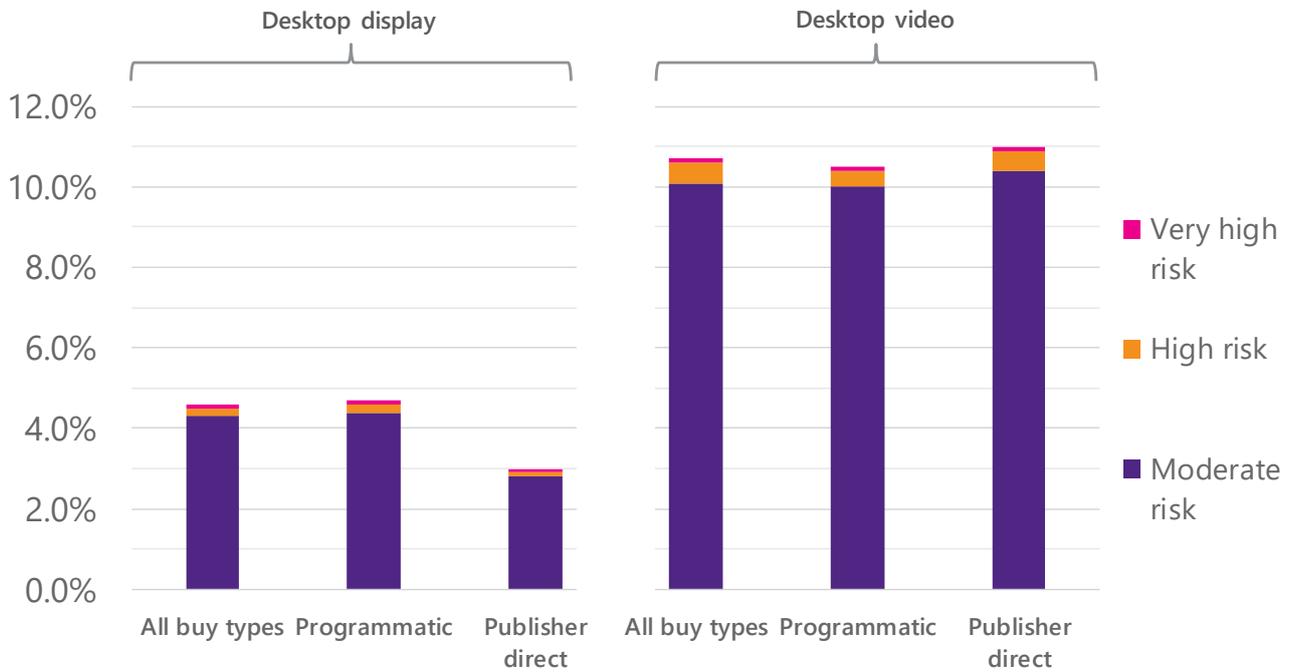
¹⁹¹ Integral Ad Science (2018). *Media Quality Report H1 2018*. Available at: <https://go.integralads.com/mqr-2018-h1.html> [Accessed on 5 Dec 2018]

¹⁹² See <https://insider.integralads.com/media-quality-report-qa-brand-risk/> for definitions of the categories.

¹⁹³ Integral Ad Science (2018). *Media Quality Report H1 2018*. Available at: <https://go.integralads.com/mqr-2018-h1.html> [Accessed on 5 Dec 2018]

relatively low. However, this may under- or over-estimate the problem because the definition of high-risk content is subjective, the bar may be set too high or too low, and/or automated monitoring is not 100% robust and may generate false positives or negatives.

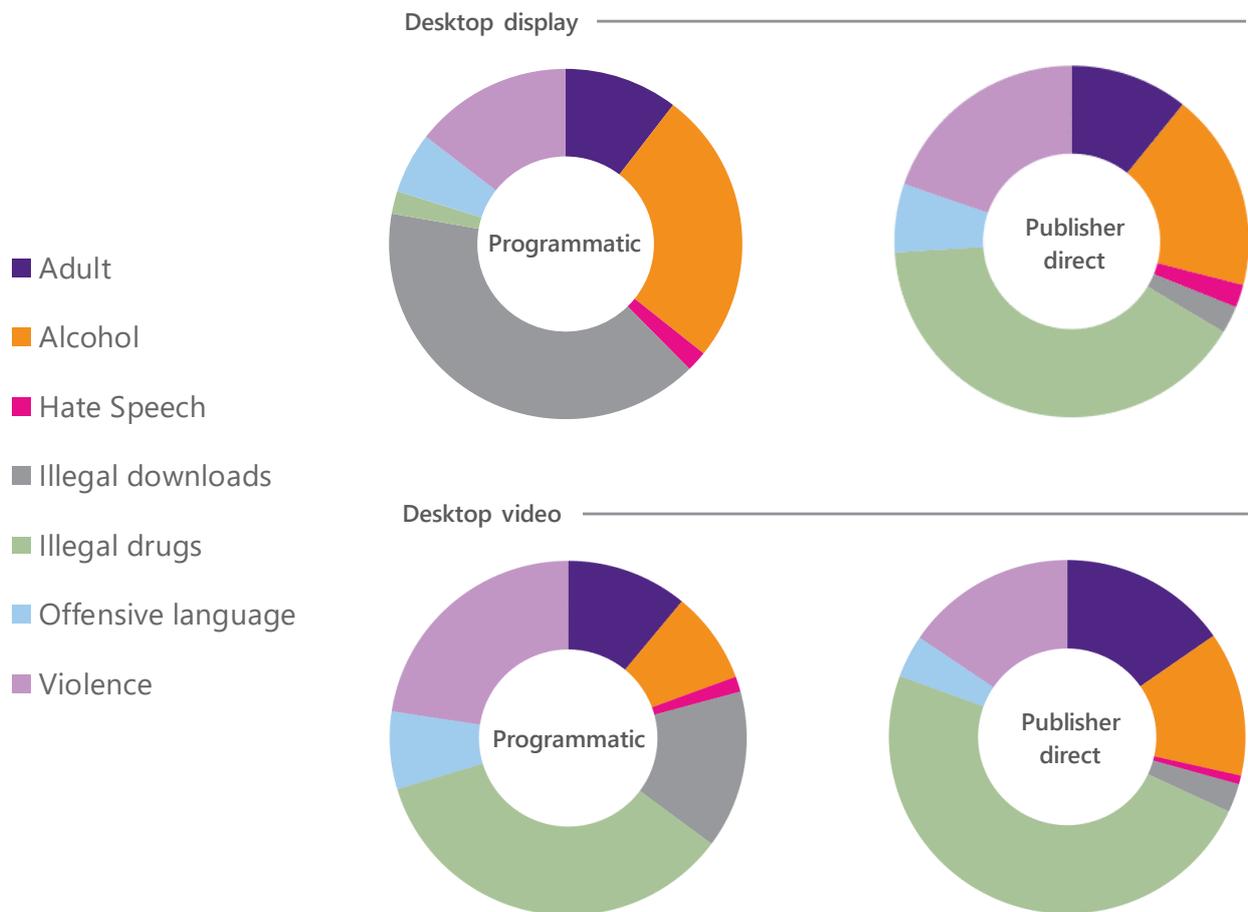
Figure 7.2: Brand safety risk by level of severity



Source: Integral Ad Science (2018)

The categories of brand risk faced vary across display and video content, and across different buy types (see Figure 7.3). However, violence, illegal drugs and alcohol are common risk factors.

Figure 7.3: Brand risk by category



Source: Integral Ad Science (2018)

There are several mechanisms by which a display advertisement can appear alongside unsuitable content:

- Smaller exchanges and SSPs may not have the same ability or resource to conduct verification checks on their inventory. During periods of high demand, advertisers may be pushed into buying from the 'long tail' of exchanges and SSPs, where verification checks may not be as rigorous (and which also raises the risk of ad fraud).
- Exchanges sometimes trade inventory with other exchanges (see Section 4.4). A small-scale exchange or other aggregator of longer tail ad inventory – which may lack direct connections to some DSPs - might sell via a larger exchange in order to access demand that is plugged into the larger exchange. In this way, the same inventory may be traded through multiple exchanges, making it hard to verify its origin. Exchanges may assume that other exchanges have already run verification checks on the inventory. The brand risk thus tends to be lower when inventory is purchased directly from the publisher.¹⁹⁴
- Verification services are not infallible and may miscategorise content. Tools that scan for keywords only work if that keyword is used in the content or URL, but may not detect euphemisms or synonyms. Video content is typically harder to verify automatically, leading to higher levels of brand safety risk for advertising on video content.

¹⁹⁴ Integral Ad Science (2018). *Media Quality Report H1 2018*. Available at: <https://go.integralads.com/mqr-2018-h1.html> [Accessed on 5 Dec 2018]

- Sites hosting user-generated content may present additional brand risk. Due to the sheer volume of content, sites typically rely on automated checks on content. However, this may miss some unsafe content, particularly video content.¹⁹⁵
- Content may be deliberately miscategorised as brand safe in order to sell ad space.

There is some evidence to suggest that the brand safety risk has been declining in the UK. According to IAS, the number of ads failing to meet brand safety standards fell from 5.8% in the second of 2017 to 4.5% in the first half of 2018, while the risk from video ads decreased from 12.2% to 10.6%.¹⁹⁶ Part of this improvement may be driven by publishers becoming better at flagging which content should and shouldn't have advertising placed against it. However, the shift towards video display and in-app advertising – where verification is more challenging – mean that brand safety is likely to remain a concern.

7.1.3 Exposure to inappropriate advertising

At one level, inappropriate online advertising may be annoying to consumers – one study estimated that the cost of “bad” display advertising was \$1.53 per thousand impressions.¹⁹⁷ However, there is also risk that consumers are exposed to online display advertising that is offensive, harmful or inappropriate. Such advertising may cause offence or distress to the viewer, and may even result in the viewer's device being compromised.

Inappropriate advertising may include the following:

- Advertising that is offensive, explicit, discriminatory or in poor taste;
- Advertising that contains malware or which forces a re-redirect of the page;
- Political advertising which breaches the relevant regulations (discussed in Section 7.2.3);
- Legitimate advertising for age-restricted products appearing to children, or any marketing that is likely to result in physical, mental or moral harm to children, or exploit their credulity, loyalty, vulnerability or lack of experience.

Having gone through initial in-house agency or brand clearance, the advertising creative potentially goes through further checks and verification at several points along the value chain. These checks are typically done by DSPs, but exchanges and publishers also run verification checks on all creatives. In the case of social media and search, Google and Facebook run equivalent automated checks with escalation to human review (nefarious actors may be able to slip in amongst the high volumes of SMEs advertising on these platforms).

These checks are described in greater detail in Section 6.3. These checks are generally automated but manual checks may also be conducted – either proactively or reactively. Exchanges also have the ability to block individual buyers within DSPs, or even an entire DSP.

Despite this, inappropriate creative may find its way to consumers. There are several ways this can happen:

¹⁹⁵ For example, concerns about brand safety on YouTube prompted over 250 brands to stop advertising on the site in 2017. See <https://www.businessinsider.com/why-advertisers-are-pulling-spend-from-youtube-2017-3?r=UK&IR=T>

¹⁹⁶ See <https://integralads.com/uk/news/h1-2018-media-quality-report-uk-viewability-hits-time-high-h1-2018/> [Accessed on 5 Dec 2018]

¹⁹⁷ This represents the cost to publishers of consumers leaving their sites due to annoying display advertising. The authors found that, in some cases, annoying display advertising could cost publishers more than it earns. See Daniel Goldstein et al (2014). *The Economic and Cognitive Costs of Annoying Display Advertisements*. Journal of Marketing Research, Vol. LI (December 2014), 742-752. Available at: https://www.microsoft.com/en-us/research/wp-content/uploads/2016/04/goldstein_suri_mcafee_ekstrand-abueg_diaz_economic_cognitive_annoying_ads_JMR_2014.pdf

- Creative may be miscategorised. Automated services are sometimes used to categorise a creative, but these systems can make mistakes. Mis-categorisation may also be a particular problem on self-service advertising platforms.
- An agency may mistakenly upload the wrong creative.
- A creative that has passed verification checks and procedures may be 'switched out' by a malicious actor at the last moment, before a campaign goes live. This tactic may be employed by nefarious or fraudulent buyers or DSPs in order to install malware on consumers' devices. Alternatively, DSPs may be hijacked by hackers in order to switch creatives.
- Advertising may be targeted at the wrong audience as a result of misreported or erroneous audience data (this may result from, for example, children misreporting their age on social media platforms).

It is difficult to estimate the scale of the problem of inappropriate advertising creative. According to industry stakeholders we interviewed, the incidence of the problem is low, with the overwhelming majority of ads served being innocuous. Some interviewees also suggested that verification services have become more effective over time. However, some instances of inappropriate creative may simply go undetected or unreported (particularly if served to relatively few consumers), which may mask the scale of the problem.

While the incidence of the problem may be relatively low, harmful creative may be seen as a major problem by consumers exposed to it. In addition, a nefarious ad may redirect a consumer to a webpage where malware is installed on the consumer's device, making that device part of a botnet which may be used to conduct advertising fraud (see Section 7.1.1) or other harmful activities. Inappropriate creative may also damage a publisher's brand, as consumers may associate the inappropriate content with that brand.

Exposure to inappropriate targeting is covered by the Committee of Advertising Practice (CAP) Code – a set of rules agreed by the industry and enforced by the Advertising Standards Authority, which also incorporates relevant legislation.¹⁹⁸ Regarding age-restricted advertising, the CAP Code requires that:

*"Marketers using interest-based factors to place age-restricted ads should be able to demonstrate that they have taken reasonable steps to exclude the relevant audience e.g. under 16s or under 18s."*¹⁹⁹

Marketers are required to make good use of targeting data – such as demographic data and interest categories – to maximise the chance that age-restricted ads are seen by adults. However, there is a tension between being able to accurately target ads and user privacy regulation, which makes assembling an accurate dataset a challenge for many non-integrated players (see Section 6.2 for further detail on data flows).²⁰⁰ This is a particular challenge on social media and content platforms, which are heavily used by under 16s who may misreport their age.²⁰¹ There is also no way to verify whether a parent or a child is using a device, making it harder to control what gets delivered.²⁰²

One respondent from the supply side of the market informed us that all programmatic display advertising running alongside content aimed at children has to be whitelisted. Publishers also have the ability to decide

¹⁹⁸ ASA (2014). *The UK Code of Non-broadcast Advertising and Direct and Promotional Marketing*. Available at: <https://www.asa.org.uk/codes-and-rulings/advertising-codes/non-broadcast-code.html>

¹⁹⁹ Committee of Advertising Practice (CAP) (2018). *Children and age-restricted ads online*. Available at: <https://www.asa.org.uk/asset/F0AB1553%2D1212%2D4106%2D8C6E6C0047FEBEBA/> [Accessed on 6 Dec 2018]

²⁰⁰ GDPR presents additional challenges for accurate targeting here, as it requires the adult of the household to have given consent for cookies and tracking data.

²⁰¹ Ofcom (2017). *Children and Parents: Media Use and Attitudes Report*. p104. Available at: https://www.ofcom.org.uk/_data/assets/pdf_file/0020/108182/children-parents-media-use-attitudes-2017.pdf [Accessed on 6 Dec 2018]

²⁰² Even requiring users to log in may not be a reliable way to determine this, as a child may be using the parent's (logged-in) account.

what categories of ads they want on their sites, and can block certain categories (e.g. alcohol advertising) entirely (though mis-categorised creatives may still slip through).

It is worth noting, however, that many similar issues also exist in offline media. For example, gambling ads often appear alongside (pre-watershed) sports fixtures, which may be seen by children.²⁰³ In this case, too, there is no effective way to tell who is sitting behind the screen at a particular point in time.

7.2 Potential societal harms

7.2.1 Support for publishers of offensive or harmful content

Online advertising has allowed publishers of content to monetise their work. However, it has also allowed creators of offensive or harmful content an opportunity to be rewarded. As Sky UK stated in their written submission to the House of Lords:²⁰⁴

“online advertising enables a viable funding model for illegal content such as terrorism material and copyright infringement”

It is challenging to estimate the amount of revenue generated by the producers of such content. In 2017, the Guardian reported that:

- Wagdi Ghoneim, a preacher banned from entering the UK, is estimated by the Guardian to have made \$78,000 from anti-western propaganda videos on YouTube;
- David Duke, a US white nationalist, is estimated to have made \$34,000 from YouTube videos; and
- Britain First, a British far-right movement, is estimated to have made \$66,000 from YouTube videos.²⁰⁵

However, in our view, it is likely that these figures very significantly overestimate the actual revenue earned by these content creators²⁰⁶. YouTube has claimed that pay-outs to such extremists were in the “tens of pounds”. In January 2018, YouTube changed its monetisation rules, making it more difficult for small content creators to generate advertising revenue²⁰⁷. YouTube has also suspended advertising on the accounts of those who breach its rules concerning hateful content, including Britain First and Tommy Robinson.²⁰⁸

In 2017 the Times reported on a YouTube advert for a Mercedes car that ran alongside a pro-Islamic State video which was viewed more than 115,000 times.²⁰⁹

²⁰³ Feller, G (2017), *Epidemic of gambling ads in daytime TV is irresponsible*. Available at: <https://www.campaignlive.co.uk/article/epidemic-gambling-ads-day-time-tv-irresponsible/1446137> [Accessed on 6 Dec 2018]

²⁰⁴ UK House of Lords (2018). *UK advertising in a digital age*. Select Committee on Communications, 1st Report of Session 2017-19. Available at: <https://publications.parliament.uk/pa/ld201719/ldselect/ldcomuni/116/116.pdf> [Accessed on 5 Dec 2018]

²⁰⁵ Neate, R (2017), *Extremists made £250,000 from ads for UK brands on Google, say experts*. Available at:

<https://www.theguardian.com/technology/2017/mar/17/extremists-ads-uk-brands-google-wagdi-ghoneim> [Accessed on 6 Dec 2018]

²⁰⁶ The Guardian assumed that all video views would be monetised at an average CPM of \$4.18, net of YouTube share. In our view, net effective CPMs are likely to be lower than this because YouTube only monetises a proportion of video views with video advertising. Its algorithm decides whether and how to monetise views. Furthermore, video views generated outside North America and Western Europe generally attract much lower CPMs.

²⁰⁷ Alexander, J. (2018). *YouTube's new monetization rules are controversial, painful and necessary*. Available at:

<https://www.polygon.com/2018/1/18/16906036/youtube-monetization-small-creators-top-creators-changes> [Accessed on 6 Dec 2018]

²⁰⁸ BBC News (2019), *YouTube suspends ads on Tommy Robinson channel*. Available at: <https://www.bbc.co.uk/news/technology-46904937> [Accessed on 21 Jan 2019]

²⁰⁹ Oakes, O (2017). *Brands accused of funding terror groups through online ads*. Available at: <https://www.campaignlive.co.uk/article/brands-accused-funding-terror-groups-online-ads/1423717> [Accessed on 5 Dec 2018]

The funding gained from advertising may be used to produce further harmful or offensive content. It may also be used to spread hate speech via other channels, or even to fund acts of terror.

The most prominent path to the monetisation of harmful content is via social media and platforms featuring user-generated content. Such platforms may employ human moderators and/or automated tools to check uploaded content. YouTube has stated that 98% of videos removed for violent extremism are now flagged by algorithms.²¹⁰ Google also stated that it had upped the threshold for monetisation for videos on YouTube. However, due to the sheer volume of content, reactive moderation is a common model.²¹¹

Harmful content may also be monetised by plugging a blog or website into Google AdSense. This will serve Google Ads into the site, assuming that at least some individual pages on the site do not violate Google's policies.²¹² Another route to monetisation is via the 'long tail' of programmatic ad exchanges. As explained in Section 7.1.2, smaller exchanges and SSPs may not have the resources or incentives to conduct comprehensive verification checks on their partners. This may allow inventory on copyright-infringing sites to be sold and traded, rewarding the site owners.

7.2.2 Discrimination

The availability and use of consumer data can allow online advertising to be more effectively targeted than its offline counterparts. This should benefit both parties: advertisers obtain more cost-effective advertising, while consumers receive advertising that is more likely to be of interest to them. However, such targeting can be used – whether by design or inadvertently – to discriminate on the basis of age, ethnicity or gender.

For example, an investigation by ProPublica and the New York Times in 2017 found that dozens of employers had used Facebook to target job ads at particular age groups, meaning that those outside those ages did not see them. In November 2016, a class action lawsuit brought in the Northern District of California against Facebook alleging targeted ad discrimination, by excluding users by ethnic affinity for advertisements on housing credit and job adverts. According to a Carnegie Mellon study in 2015, Google allowed advertisers to target men much more than women for higher-paid jobs.²¹³ And in 2018, The American Civil Liberties Union (ACLU) submitted a complaint to the US Equal Employment Opportunity Commission alleging gender discrimination in job advertising on Facebook.²¹⁴

Facebook has taken various steps over the years to resolve this issue. These include forbidding ads with discriminatory content; having a policy to not allow ads to discriminate on attributes like race, gender, sexual orientation; ending the use of culturally-based audience selection tools to exclude or target ads.²¹⁵ Some steps taken by Google include showing 'Why this ad notices' and consumer's ability to opt out of interest-based ads.²¹⁶

However, these steps have not eliminated the risk of discrimination. According to one research study, advertisers on Facebook can still discover attributes that can be used for highly discriminatory audience targeting, use

²¹⁰ UK House of Lords (2018). *UK advertising in a digital age*. Select Committee on Communications, 1st Report of Session 2017-19. Available at: <https://publications.parliament.uk/pa/ld201719/ldselect/ldcomuni/116/116.pdf> [Accessed on 5 Dec 2018]

²¹¹ Part of the issue is also that interpretations of platforms' own content policies are not always consistent. Platforms may allow harmful content on free speech grounds, or policy may be applied inconsistently. See Matsakis, L. (2018). *YouTube doesn't know where its own line is*. Available at: <https://www.wired.com/story/youtube-content-moderation-inconsistent/> [Accessed on 5 Dec 2018]

²¹² Medium (2017). *Google AdSense allows ads on extremist sites*. Available at: <https://medium.com/@Storyzy/google-adsense-allows-ads-on-extremist-sites-33958eb86aa7> [Accessed on 7 Dec 2018]

²¹³ Moore, M. (2018). *How the online business model encourages prejudice*. Available at: <https://www.theguardian.com/technology/2018/oct/28/how-target-ads-threaten-the-internet-giants-facebook>

²¹⁴ BBC News (2018). *Facebook accused of job ad gender discrimination*. Available at <https://www.bbc.co.uk/news/technology-45569227>

²¹⁵ Tsukayama, H. (2017). *Facebook cracks down on ads that discriminate*. Available at: https://www.washingtonpost.com/news/the-switch/wp/2017/02/08/facebook-cracks-down-on-ads-that-discriminate/?noredirect=on&utm_term=.a8c23e24119d

²¹⁶ White, G. (2017). *When Algorithms Don't Account for Civil Rights*. Available at: <https://www.theatlantic.com/business/archive/2017/03/facebook-ad-discrimination/518718/>

Personally Identifiable Information (PII)-based audience targeting and look-alike audience targeting which has the potential to discriminate at scale.²¹⁷ Facebook has responded by announcing the removal of 5000 ad targeting options, starting in the United States.²¹⁸ It has also restricted the ability of its partners to create categories.

Part of the challenge in this area is the use of automated tools advertising. Such tools are used for audience segregation to enable more effectively targeted advertising, but may also create inadvertently discriminatory categories. Automated processes are also used for dynamic content optimisation – enabling changes to the ad creative for each ad impression based on user data (so different users see different combinations of images in their ad). These algorithms may also lead to inadvertent discrimination against certain groups of users.

7.2.3 Political advertising

While the focus of this report is on commercial advertising, for completeness we briefly discuss some of the specific issues associated with online political advertising below.

With 64% of UK adults going online to find information on news and current affairs,²¹⁹ the Internet has become an important platform for campaigning and engaging voters. However, online political advertising also poses a specific set of risks to the democratic process. These include opaque funding sources, the rise of fake news, misleading advertising and breach of regulations.

In the UK, political advertising on broadcast media – TV and radio – is prohibited,^{220,221} although political parties are given airtime for political broadcasts. By contrast, online political advertising is not regulated outside of election periods. During election periods, UK electoral law sets limits on the amount that can be spent on campaign activity – including online advertising in the regulated period before elections and referendums.²²² Online political advertising must also comply with relevant data protection and privacy regulations.²²³

The current framework gives rise to several areas of concern:

- **Opacity of funding.** There is not currently any requirement to disclose funding sources for political advertising outside of election periods. This means that anonymous actors – including those based overseas – can use political advertising to influence political debate in the UK.²²⁴ This type of activity has prompted the Electoral Commission to call for a set of urgent reforms, including requiring online political ads to include an ‘imprint’ disclosing who paid for the ad (as with printed leaflets).²²⁵
- **Transparency of digital campaigns.** Campaigners use personal data to target voters on social media, based on demographic factors like age and gender, on their interests and on their physical location (‘micro-targeting’).²²⁶ Such advertising can be hard to trace: only the company and campaigner know

²¹⁷ Speicher, T. et al (2018). *Potential for Discrimination in Online Targeted Advertising*. Proceedings of Machine Learning Research 81:1-15, 2018. Available at: <http://proceedings.mlr.press/v81/speicher18a/speicher18a.pdf> [Accessed on 10 Dec 2018]

²¹⁸ Statt, N. (2018). *Facebook will remove 5,000 ad targeting categories to prevent discrimination*. Available at: <https://www.theverge.com/2018/8/21/17764480/facebook-ad-targeting-options-removal-housing-racial-discrimination>

²¹⁹ Jigsaw Research for Ofcom (2018). *News Consumption in the UK: 2018*. Available at: https://www.ofcom.org.uk/_data/assets/pdf_file/0024/116529/news-consumption-2018.pdf

²²⁰ Communications Act 2003, Section 321. Available at: <https://www.legislation.gov.uk/ukpga/2003/21/section/321>

²²¹ ASA – BCAP Code: 07 Political and controversial matters. Available at: https://www.asa.org.uk/type/broadcast/code_section/07.html

²²² The Electoral Commission (2018). *Digital Campaigning: Increasing transparency for voters*. Available at: https://www.electoralcommission.org.uk/_data/assets/pdf_file/0010/244594/Digital-campaigning-improving-transparency-for-voters.pdf

²²³ Information Commissioner's Office (2018). *Guidance on Political Campaigning*. Available at: https://ico.org.uk/media/1589/promotion_of_a_political_party.pdf

²²⁴ For example, an anonymously funded campaign spent over £250,000 on political ads designed to influence UK voters in October 2018. See BBC News (2018). *Anonymous Pro-Brexit ads on Facebook say 'bin Chequers'*. Available at: <https://www.bbc.co.uk/news/uk-45926892>

²²⁵ Oakes, O. (2018). *IPA welcomes digital imprint for political ads as UK regulator warns 'democracy under threat'*. Available at: <https://www.campaignlive.co.uk/article/ipa-welcomes-digital-imprint-political-ads-uk-regulator-warns-democracy-threat/1486055>

²²⁶ Sometimes referred to as “dark ads”.

why a voter was targeted and how much was spent on a particular campaign. Invoices for digital campaigns may also contain very little detail. These factors make it difficult for the Electoral Commission to assess whether spending limits are being adhered to.²²⁷

- **Misleading claims.** Unlike commercial advertising, which is regulated by the ASA, there is no complaints procedure for political ads that make misleading claims (the ASA received over 350 complaints but was unable to act upon them).²²⁸ There may be little repercussion to making untruthful claims, particularly for one-off votes (where voters cannot punish those making the claims in future elections).

Much of the focus on political advertising has been on the role of Facebook and other social networks, as the detailed data these networks hold on their users makes microtargeting strategies viable. In October 2018, Facebook made several changes to the way it deals with political ads. Political advertisers must prove their identity and that they are based in the UK, and their ads will carry an imprint indicating who paid for them. A publicly-available online archive will also store previous ads, the amount spent and their reach. Users can also flag when an ad contains misleading information.²²⁹

However, part of the challenge remains the disconnect between the regulation of online political advertising and other forms of advertising. This means that Facebook – and other platforms – are not obliged to make the above changes.

7.3 Potential economic harms

This section discusses harms that could potentially arise as a result of the structure of the online advertising market. It identifies aspects of that structure that may impact the development or emergence of greater competition within the market. In the long run, a lack of effective competition in the market could lead to a number of negative outcomes – including higher prices for advertisers, price discrimination, and more (or more intrusive) ads for consumers than would be seen under a competitive market.

We first briefly revisit the structure of the online advertising market and the main players. We then consider the economic barriers which may inhibit the emergence of greater competition in the market. Finally, we discuss potential anti-competitive practices that could arise as a result of the market structure.

Note that this is neither a market definition exercise nor a formal competition assessment. The term ‘market’, as used here, is employed in a general and descriptive sense, and does not connote a formally-defined market. Market definition is challenging in the online advertising sector as:

- in many cases, online advertising markets are two-sided;
- different market segments overlap, with some degree of substitutability between them; and
- the market is changing rapidly.

We do not take a view on whether anti-competitive practices are occurring, nor how likely they are to emerge. This section is intended to highlight areas of potential concern for further investigation (if deemed necessary).

²²⁷ The Electoral Commission (2018). *Digital Campaigning: Increasing transparency for voters*. Ch. 3. Available at: <https://www.electoralcommission.org.uk/find-information-by-subject/political-parties-campaigning-and-donations/digital-campaigning/3-spending-on-digital-campaign-activity>

²²⁸ Parker, G. (2016). *Most political players shun ad standards that big companies sign-up to*. ASA blog post, 05 Jul 2016. Available at: <https://www.asa.org.uk/news/most-political-players-shun-ad-standards-that-big-companies-sign-up-to.html>

²²⁹ Cellan-Jones, R. (2018). *Facebook tool makes UK political ads ‘transparent’*. Available at: <https://www.bbc.co.uk/news/technology-45866129>

7.3.1 Market structure and development

As set out in Sections 4 and 5, firms compete at various levels of the online advertising value chain. Of particular note is the prominence of the US-based internet companies:

- Google has market leadership in search, programmatic display intermediaries and programmatic display ad server technology.²³⁰
- Facebook has a majority share of social display and is leader in overall display.²³¹
- Collectively, Facebook and Google were estimated to have accounted for over half (54%) of all UK online advertising revenues in 2017.²³²

Google and Facebook also have prominent positions in the provision of various user services. Google and Facebook properties both reach more than 90% of UK internet users every month.²³³ Three in five (62%) UK adults have a Facebook account or profile.²³⁴ Google's share of web search in the UK is around 92%.²³⁵

Figure 7.4: Top ten web properties accessed in the UK

Average time spent per person per month

<100 mins 100-300 mins >300 mins

Rank	2016		2017		2018	
	Property	Reach	Property	Reach	Property	Reach
1	Google Sites	98%	Google Sites	98%	Google Sites	99%
2	Facebook	87%	Facebook	91%	Facebook	95%
3	Amazon Sites	82%	Microsoft Sites	87%	BBC Sites	93%
4	Microsoft Sites	82%	BBC Sites	87%	Amazon Sites	89%
5	BBC Sites	81%	Amazon Sites	85%	Microsoft Sites	87%
6	Yahoo Sites	72%	Trinity Mirror Group	73%	Oath	81%
7	eBay	69%	eBay	71%	Sky Sites	73%
8	Sky Sites	65%	Mail Online/Daily Mail	70%	Trinity Mirror Group	71%
9	Trinity Mirror Group	64%	Yahoo Sites	69%	News UK Sites	71%
10	Mail Online/Daily Mail	63%	Sky Sites	67%	eBay	69%

Source: comScore MMX Multi-Platform, March 2016-2018. Includes web access via desktop, tablet and mobile devices, and access via mobile apps.

²³⁰ See Section 5.2

²³¹ See Section 5.2

²³² eMarketer (2017). *Digital Duopoly to Remain Dominant in UK Ad Race*. <https://www.emarketer.com/Article/Digital-Duopoly-Remain-Dominant-UK-Ad-Race/1016481>

²³³ Ofcom (2018). *Communications Market Report 2018*. Available at: https://www.ofcom.org.uk/_data/assets/pdf_file/0022/117256/CMR-2018-narrative-report.pdf p65

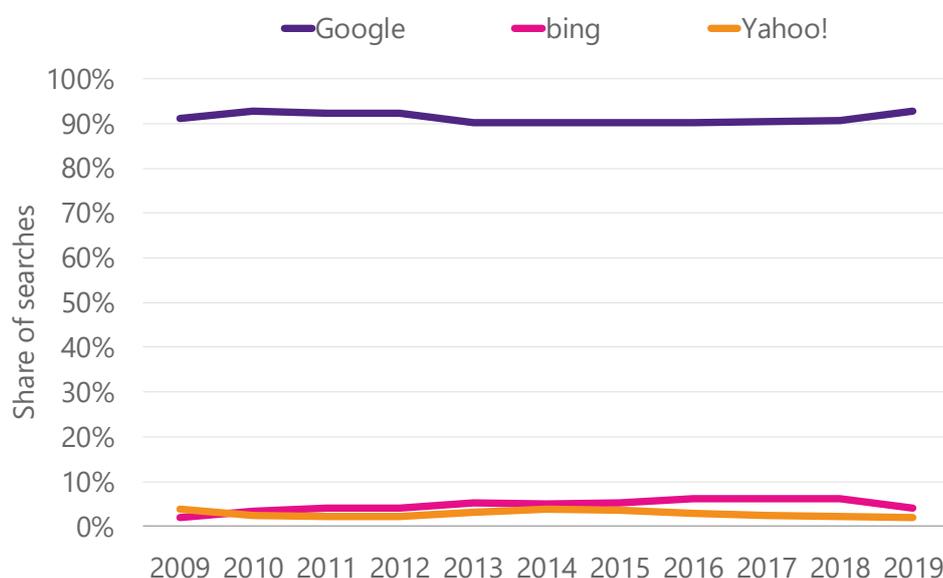
²³⁴ Ofcom (2018). *Adults' Media Use and Attitudes Report 2018*. Available at: https://www.ofcom.org.uk/_data/assets/pdf_file/0011/113222/Adults-Media-Use-and-Attitudes-Report-2018.pdf

²³⁵ Statcounter. (2018). *Search Engine Market Share - United Kingdom*. Available at: <https://www.statista.com/statistics/280269/market-share-held-by-search-engines-in-the-united-kingdom/> [Accessed on 04 Jan 2018]

These user services markets are relevant as they provide vast quantities of data, which in turn can be used to enhance an advertising proposition by enabling more effective targeting and measurement of campaigns. This is widely regarded as an enormous asset.²³⁶ Crucially, this data is also regarded as high quality: these platforms have a more holistic view of consumers across multiple touchpoints, and as a result of the 'logged in' environments they operate.

The market positions of Google and Facebook in search and social display show little signs of changing in the near term. According to ComScore, Google and Facebook sites were the top two sites accessed by UK users in each of the past three years (see Figure 7.4). Visitors to these sites spent, on average, over 5 hours each month on those sites.²³⁷

Figure 7.5: Share of search by search engine, UK²³⁸



Note: data represent the share of searches across desktop, mobile, tablet and console.

In 2017, the European Commission adopted a decision which concluded that Google had held a dominant position in "general search"²³⁹ in every market of the EEA (except the Czech Republic) since 2007.²⁴⁰ In terms of display advertising, the French competition authority stated in 2018 that:

*"in the last few years, no company has succeeded in significantly increasing its market share in Europe in the Display advertising sector compared to Google and Facebook."*²⁴¹

Some respondents expressed a view that Amazon may present a potential challenge to Google and Facebook in the online advertising space. Although Amazon is still nascent in the market, in September 2018 the Telegraph reported that it had overtaken Verizon Media Group and Microsoft to become the third biggest market player in

²³⁶ The Economist (2017). *The world's most valuable resource is no longer oil, but data*. Available at:

<https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data>

²³⁷ Ofcom (2018). *Communications Market Report 2018*. Available at: https://www.ofcom.org.uk/_data/assets/pdf_file/0022/117256/CMR-2018-narrative-report.pdf

²³⁸ Statcounter. (2018). *Search Engine Market Share - United Kingdom*. Available at: <https://www.statista.com/statistics/280269/market-share-held-by-search-engines-in-the-united-kingdom/> [Accessed on 04 Jan 2018]

²³⁹ General search includes all search queries that are not conducted on 'specialised' search services focused on particular verticals (for example, flights, hotels, restaurants or news).

²⁴⁰ See Official Journal of the European Union (2018). *Case AT.39740 – Google Search (Shopping)*. Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018XC0112\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018XC0112(01)&from=EN)

²⁴¹ Autorité de la Concurrence (2018). *Opinion no. 18-A-03 of 6 March 2018 on data processing in the online advertising sector*. Available at: http://www.autoritedelaconcurrence.fr/doc/avis18a03_en_.pdf [Accessed on 3 Dec 2018]

the US. A number of respondents expressed the view that Amazon has access to unique and high-quality data, potentially making it a compelling proposition for advertisers.

7.3.2 Market features that may facilitate anti-competitive conduct

For various reasons (which may be different in each case) there are likely to exist barriers to entry and expansion in both online advertising and digital user services markets. The presence of substantial barriers to entry or expansion can facilitate anti-competitive behaviour within a market (conversely, the threat of market entry or expansion can act as a constraint on anti-competitive behaviour).

For display advertising, barriers to entry are likely to be low for online publishers that elect to sell advertising via Google Ad Sense or Facebook Audience Network, or via the programmatic ecosystem. Google and Facebook have helped to lower barriers to entry by developing self-service platforms for smaller publishers, and enabling those publishers to monetise a global market.

However, barriers to entry may be significant for advertising intermediaries, due to the large technology development costs in building a platform to rival existing players. New entrant publishers or social networks wishing to enter the direct sales market are also likely to face barriers, as substantial audiences are required in order to sell direct to buyers.

For search, barriers to entry may be substantial, as economies of scale are likely to be present not only in managing the volume of search queries, but in the use of those queries to improve search results.²⁴²

Below we explore barriers that may make it harder for existing competitors and new entrants to compete in the online advertising market.

- **Network effects.** Network effects occur when the value of a service to an individual user increases as the number of users increases. Strong network effects are present in various digital user services markets, most noticeably social networks. Facebook and Google also offer several interdependent and linked services, the value of which may be reinforced with more users on the same or the interlinked platforms. These network effects may make it challenging for nascent digital services to attract users. This is relevant for the online advertising market as digital user services are used both to directly advertise to users and to collect user data for enhanced targeting and attribution.

In addition, two-sided network effects are likely to be present in display advertising intermediation, where large numbers of advertisers and publishers are both present on the advertising exchange. Network effects can benefit advertisers (or publishers), as the larger scale makes it more likely to find better quality matches with potential publishers (or advertisers).

- **Economies of scale** Economies of scale occur when the cost per unit of output falls as that output increases, due to cost advantages enjoyed by larger enterprises. The creation of sales, bidding and ad-serving platforms is likely to involve substantial fixed costs, benefitting firms which are able to spread these costs over a larger number of users. Platforms operating at a global scale are also likely to derive economies of scale from running the same buying platforms across a number of different markets.

In addition, in the online advertising market, advertisers/agencies generally want to reach audiences at scale, favouring larger platforms. Even if a campaign is highly targeted, the starting point needs to be a

²⁴² Centre on Regulation in Europe (CERRE) (2017). *Big Data and Competition Policy: Market power, personalised pricing and advertising*. p33. Available at: https://cerre.eu/sites/cerre/files/170216_CERRE_CompData_FinalReport.pdf [Accessed on 10 Dec 2018]

large-scale audience so the sub-segment targeted is sufficiently large. Consequently, advertisers are drawn towards large-scale platforms and will often pay a premium for this.

Large-scale platforms are also attractive to advertisers as they may reduce the risk of duplication.²⁴³ For example, if an advertiser buys ads against 1 million people on Facebook it knows that they are all unique individuals and money is not wasted on duplication. If an advertiser buys 500k people on Facebook and 500k people on the open market it knows there will be some duplication (so this is less efficient).

- **Economies of scope.** Economies of scope occur when a firm derives cost efficiencies from the variety of its various (complementary) operations. Economies of scope are likely to arise when firms operate on both the demand and supply side of the programmatic display market. The two sides of the business may, to an extent, share a number of costs, such as premises and technology costs. They may also be able to reduce dependence on third party data suppliers by sharing data internally.

In addition, online advertising platforms also operate a variety of digital user services. These services often provide data that can be used to enhance the platforms' online advertising proposition by allowing more accurate ad targeting.

- **Vertical and horizontal integration.** There are two main implications of integration in the online advertising market:
 - Technical integration – vertically-integrated firms can combine the data received at different levels of the value chain, leading to more accurate ad targeting, analytics and attribution. Horizontally-integrated firms can draw in data from other parts of their business. In both cases, compliance with GDPR is also likely to be easier than for non-integrated firms, as data can be shared between different parts of the same business (while a non-integrated firm would have to ensure that the user had provided consent to share the data with a third party).
 - Commercial – firms operating on both sides of a two-sided market (e.g. the demand and supply side of the display market) have the ability to adjust the fees charged to either side of the market. The integrated firm may attempt to foreclose competition in one side of the market, while relying on the proceeds from the other.
- **Access to data.** Data is used extensively within the online advertising market to enhance the targeting and measurement of advertising campaigns. As mentioned above, integrated firms and large platforms have access to richer and more comprehensive datasets. For example, some platforms operate 'logged in' environments for user services, which generates high-quality data on user activity. Smaller, non-integrated firms are unlikely to have access to such data, and must rely instead on data from third-party data brokers, which (anecdotally) does not perform as well. GDPR has made access to data more challenging for smaller players, as they must verify user consent for the usage and sharing of their data.

It should also be noted that, while the market features identified above may represent barriers to entry in the market, they may also generate benefits to publishers and advertisers:

- network effects offer benefits to the users of larger platforms as there is a wider range of advertisers and publishers;
- economies of scale and scope can mean services are offered at lower cost or increased utility to consumers;

²⁴³ As Google and Facebook do not share user ID data with buyers, the buyer does not know audience overlap across Facebook/YouTube and other media.

- vertically-integrated firms can offer value to publishers and advertisers, as implementation and monitoring can be easier; and
- reduced flow of user data between industry players may mean that there is a lower risk of users' data being shared without consent.

7.3.3 Stakeholders' concerns

As a consequence of their position in the market, and the barriers to entry identified in Section 7.3.2, Google and Facebook may well have the ability to act in an anti-competitive way. Given that parts of the market are opaque - such as how algorithms work - it is not clear whether such practices are occurring. Interviewees noted various areas for potential concern in the industry, which may have the potential to impact competition in the online advertising market.

We present some of these areas of concern below. These are broadly aligned with the findings of the Australian and French competition investigations.^{244,245} Note that it is not within the scope of this work to investigate these practices, nor to conduct a formal competition assessment.

- **Product bundling and exclusivity.** Vertically-integrated firms may make the use of one product conditional on the use of other products, or offer strong inducements to use their full product suite. Some stakeholders noted that Google has been very successful in integrating DV360 with other products such as analytics and the advertiser ad server. Some stakeholders indicated that Google incentivises the use of DV360 by making more detailed data available to its users (however, it should also be noted that some stakeholders also pointed to Google's service being very easy to implement and monitor).

In addition, certain products are offered on an exclusive basis – for example, display inventory on Amazon's 'owned and operated' websites (such as IMDb) is only available through Amazon's DSP.²⁴⁶ It is suggested that such exclusivity may negatively impact competition in the market, as potential customers may be forced to use particular intermediation services in order to gain access to display inventory or analytics data.

- **"Walled gardens"**. Some in the industry have referred to the larger online advertising platforms as operating 'walled gardens'. Generally, these platforms do not share data with third-parties, but do allow partners to import data onto their platforms for use in targeting or to measure attribution.

Various stakeholders suggested that it was not always clear how measurement and attribution is handled on these platforms. While some third party firms offer verification and measurement services for ads served on these platforms, there is some scepticism about whether such services are fully independent, as the measurement is based upon data collated by the platforms themselves. Online advertising platforms may therefore have the ability to distort the market by overstating the performance of advertising on their platform.

Some stakeholders also indicated that it was not easy or possible to export user ID data collected during advertising campaigns from the platforms (although aggregate data is provided). Some felt that GDPR had made this more of a challenge, singling out Google in particular as adopting a very cautious

²⁴⁴ ACCC (2018). *Digital Platforms Inquiry – Preliminary Report*. Available at: <https://www.accc.gov.au/focus-areas/inquiries/digital-platforms-inquiry/preliminary-report> [Accessed on 13 Dec 2018]

²⁴⁵ Autorité de la Concurrence (2018). *Opinion no. 18-A-03 of 6 March 2018 on data processing in the online advertising sector*. Available at: http://www.autoritedelaconcurrence.fr/doc/avis18a03_en_.pdf [Accessed on 3 Dec 2018]

²⁴⁶ See <https://advertising.amazon.com/products/amazon-dsp> [Accessed on 20 Dec 2018]

interpretation of GDPR. This interpretation is perceived as having strengthened Google's market position relative to other services.

- **Lack of transparency.** Stakeholders highlighted a general perception of a lack of transparency in the market for programmatic display. In this market, trading is conducted via algorithms that cannot be audited, auctions may be conducted in a variety of ways (first-price, second-price), and information about auction bids is not always available.

Even if all these things are made clear, industry participants have the ability to adjust other metrics such as viewability (given that auctions run on a CPM basis, not taking into account viewability) in order to influence the outcome of auctions. Consequently, some interviewees had a strong sense of distrust of the programmatic display industry and considered that it was quite difficult to tell whether advertisers and other participants are getting a fair deal.

- **Differential treatment.** Some stakeholders suggested that there may be differential treatment of different display advertising inventory by integrated firms, such as Google, Verizon, AppNexus and AdForm (see Section 5.4). Such firms may be in a position to give priority to their own display inventory over that of others, or to favour their own demand sources in auctions. The opacity of the intermediation market makes this difficult to verify or refute.
- **Leveraging.** Various stakeholders noted that the strong positions of online platforms at different levels of the online advertising market could be leveraged into other parts of the market. Some stakeholders suggested that online platforms were able, to a large extent, to set the 'rules of the game' in the market, by not negotiating fees and by specifying the terms of service.

Some also voiced concerns that the strong positions of certain players in related markets (such as web browsers, mobile operating systems and messaging services) could be parlayed into strong positions in new and future forms of advertising. Google's AMP was cited as an previous example of this.²⁴⁷

- **Lack of involvement with industry initiatives.** Stakeholders noted that some of the larger players in the market do not always adopt industry-led efforts to facilitate standardisation. One example of this is the IAB Europe's Transparency and Consent Framework (though Google is expected to implement the framework from January 2019).²⁴⁸ Respondents noted that without the involvement of Google and/or Facebook, industry initiatives were not likely to get very far.
- **Browser adblocking.** Some stakeholders expressed concerns that operators of web browsers could unilaterally change adblocking and data-collection settings (or default settings) on their browsers. Such a change could render some display advertising business models unsustainable. Stakeholders pointed to changes made by Apple to its Safari browser as an example of this.²⁴⁹

These concerns were focussed in particular on Google's Chrome browser, which, in the UK, has an estimated market share of 49% across all platforms and 66% on desktop^{250,251}. Google has the ability to make changes to the Chrome browser to block ads (for example, in February 2018, Chrome started

²⁴⁷ See Bundeskartellamt (2018). *Online advertising*. Series of papers on "Competition and Consumer Protection in the Digital Economy". Available at: https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Schriftenreihe_Digitales_III.pdf?__blob=publicationFile&v=5 [Accessed on 17 Nov 2018], p7, for more detail about Google AMP.

²⁴⁸ Hercher, J. (2018). *Why Google and the IAB Europe haven't been able to resolve online consent*. Available at: <https://adexchanger.com/online-advertising/why-google-and-the-iab-europe-havent-been-able-to-resolve-online-consent/> [Accessed on 14 Dec 2018]

²⁴⁹ The Drum (2018). *Intelligent Tracking Prevention: preparing for iOS 11 and Safari updates*. Available at:

<https://www.thedrum.com/opinion/2017/09/12/intelligent-tracking-prevention-preparing-ios-11-and-safari-updates> [Accessed on 18 Nov 2018]

²⁵⁰ Stat counter Global Stats (2018). *Browser Market Share United Kingdom*. Available at: <http://gs.statcounter.com/browser-market-share/all/united-kingdom> [Accessed on 18 Nov 2018]

²⁵¹ See also: https://data.gov.uk/data/site-usage#browsers_names

blocking ads classed as intrusive by the Coalition for Better Ads). This ability could be used to favour its own display advertising, for example, by blocking display advertising hosted by others.

Appendix A Market share data

There is very limited market share data. Our analysis of indicative market shares is based on the following data points and analysis:

Search market shares. Benchmarks from the USA indicate that Google accounts for 91% of searches (including Google images, maps and YouTube) and 85% of search revenue, followed by Microsoft Bing (8%), Verizon (3%), Yelp (2%), IAC (1%) and Amazon (1%)²⁵². UK data indicate a similar pattern: Google (92%), Microsoft (5%), Verizon (2%), DuckDuckGo (0.5%)²⁵³.

Social display market shares. Facebook UK Ltd reported 2017 revenues of £1.27bn at Companies House²⁵⁴. Separately, Facebook stated that "revenue from customers supported by our UK teams is recorded in the UK"²⁵⁵. Certain interviewees noted that some advertisers targeting Facebook users in the UK are supported by Facebook teams outside the UK or deal with automated interfaces, not teams. Consequently, revenues generated by advertising to Facebook's UK users is likely to exceed £1.27bn. Interviewees believed that YouTube accounts for the majority of other social media expenditure, consistent with data from the USA which suggests that Twitter and Snapchat each generate 21 times less revenue than Facebook²⁵⁶.

Other display market shares. There is no data for the share of other display expenditure taken by intermediaries and this share varies between banner display, native and video (it is low for in-stream video). We estimate this share at about 10% to 20% of revenues, after agency share of which Google accounts for about one-third. There is no accurate data for share of spend by media owner, but industry interviewees believe that major broadcasters account for a substantial share of the market.

²⁵² Visual Capitalist. (2018). *This Chart Reveals Google's True Dominance Over the Web*. Available at: <https://www.visualcapitalist.com/this-chart-reveals-googles-true-dominance-over-the-web/> [Accessed on 18 November 2018]

²⁵³ Statcounter. (2018). *Search Engine Market Share - United Kingdom*. Available at: <https://www.statista.com/statistics/280269/market-share-held-by-search-engines-in-the-united-kingdom/> [Accessed on 04 Jan 2018]

²⁵⁴ Facebook UK Limited. Annual report and financial statements for the year ended 31 December 2017. Available at: <https://beta.companieshouse.gov.uk/company/06331310/filing-history>

²⁵⁵ Oakes O. (2018). *Facebook UK revenues surpass Channel 4's ad sales*. Available at: <https://www.campaignlive.co.uk/article/facebook-uk-revenues-surpass-channel-4s-ad-sales/1495255> [Accessed on 18 Nov 2018]

²⁵⁶ eMarketer. (2018). *Data Suggests Surprising Shift: Duopoly Not All-Powerful Amazon and Snapchat are experiencing faster growth*. Available at: <https://www.emarketer.com/content/google-and-facebook-s-digital-dominance-fading-as-rivals-share-grows> [Accessed on 18 Nov 2018]

Appendix B Glossary

Ad inventory. The amount and types of ad space a publisher has available for an advertiser to buy.

Ad optimisation. A means of improving campaign performance through automated and semi-automated means, usually through a systematic approach. Ad optimisation often focuses on cost (especially prices in automated bidding), targeting or creative, gleaned performance improvements through testing.

Attribution. Attribution is the technique used to measure the monetary impact a piece of communication has on real business goals. For example: sales (volume and total), profit, revenue and retention. The application of attribution modelling in digital advertising allows marketers to understand what events (e.g. display ad exposure, active search, search ad exposure, price comparison site) truly influence individuals to convert and thus allocate credit to different formats and tactics within the customer path to purchase. Early attribution models include first-touch and last-touch attribution. Models broadly recognised as more accurate include, but not-only, multi-touch linear, multi-touch time decay and multi-touch algorithm-based.

Augmented reality (AR). A technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view.

Bid request. Bid requests are notices placed by into the real-time bidding system by SSP/ad exchanges to inform buyers about an impression that is for sale. The request generally includes data about the seller, ad unit, time and user.

Brand safety. The set of measures that aim to protect a brand's image from the negative or harmful influence of inappropriate or questionable content on the publisher site where an ad is served.

Conversion. A descriptor encompassing a user who is browsing online converting to a paying user, or a user that performs an action of some sort.

Cookie. A cookie, also known as an HTTP cookie, web cookie, or browser cookie, is a string of text sent from a web server to a user's browser that the browser is expected to send back to the web server in subsequent interactions.

Cost per acquisition or action (CPA). Price for acquiring one user or desired action.

Cost per click (CPC). The price for a click on an advertiser's sponsored search listing or display ad.

Cost per mille (CPM). The price for every thousand times an ad is shown.

Frequency. The number of a times a specific user is shown a particular advertisement.

Frequency cap. A restriction on the number of times a specific user is shown a particular advertisement.

Impression. A metric expressing each time an ad is served and displayed, whether it is seen or not, whether it is clicked on or not.

Insertion order. An Insertion Order is a purchase order issued between a seller of advertising and a buyer (usually via an advertising agency or media representative), and includes information such as start date, end date, number of impressions to be served and cost.

Press publisher. Press publisher online services are the subset of online publishers operated by press publishers, such as the print news media.

Programmatic direct. Inventory is bought from a particular media owner using automated processes, where a direct relationship exists between the buyer and media owner in the form of pre-existing deal terms. So, rather than having to call up to buy a space for a set amount of time, spaces can be bought automatically with pricing limits etc.

Programmatic indirect. Inventory is bought on an impressions-by-impression basis in real-time through an open, unreserved auction. This essentially means that a space is available to be bought at the highest price and there doesn't have to be a pre-existing agreement between the advertiser and the seller.

Programmatic. Programmatic trading is the use of automated systems and processes to buy and sell inventory. This includes, but is not limited to, trading that uses real time bidding auctions.

Publisher. We use the term publisher broadly to refer to any online operator that attracts an audience to content it provides.

Social media. Social media are interactive computer-mediated technologies that facilitate the creation and sharing of information, ideas, interests and other forms of expression via virtual communities and networks.

Tracking pixel or pixel. A 1x1 pixel-sized transparent image that provides information about an ad's placement. In many cases, a tracking pixel is used to notify an ad tracking system that either an ad has been served (or not served, in some cases) or that a specific webpage has been accessed. Also known as a beacon, web beacon, action tag or redirect.

User ID. A user ID is a unique customer identifier by which a publisher identifies a user visiting its website – usually including only pseudonymous data.

Viewability. Viewability is an online advertising metric that aims to determine only impressions that had the opportunity to be seen by users. For example, if an ad is loaded at the bottom of a webpage but a user doesn't scroll down far enough to see it, that impression would not be deemed viewable. Viewability is not a measure of ad effectiveness.

Virtual reality (VR). The computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors.

Yield. Yield is the revenue that a publisher receives for their available inventory, calculated as fill-rate (the proportion of inventory sold) x price. Yield management or yield optimisation involves varying sales channels and prices in order to maximise fill rate x price.

Appendix C Gaps in the available data

We identified the following gaps in the available data about the online advertising market:

1. Market share. Publishers and social media and search platforms generally do not report revenues generated by sales of online advertising targeting UK users. Or, in cases where they do report UK revenues, they use their own definition of UK revenues, such as the location of sales, not the location of the audience. Consequently, there is no commonly agreed market share data for the online advertising market as a whole or its market segments.
2. Share of expenditure taken by programmatic intermediaries. There is no census level data about the share of advertiser expenditure taken by programmatic intermediaries, such as DSPs and SSPs/ad exchanges.
3. Digital ad fraud. The prevalence of ad fraud is, by nature, hard to measure. Some fraud goes undetected and fraud prevention systems can throw up false positives.
4. Exposure of consumers to inappropriate advertising. Sometimes this exposure goes unreported, making it difficult to assess the true scale of the problem.
5. Political advertising. Impermissible political advertising (undeclared or untraceable spending during election periods) is by its nature hard to trace. In particular this includes 'microtargeted' advertising – aimed at particular groups or individuals. This makes the true extent of the problem challenging to assess.

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