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Towards a comparative and integrative framework for regulatory oversight of online advertising: Challenges, mitigation strategies, outcomes, and areas of intervention

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Towards a comparative and integrative framework for regulatory oversight of online advertising

Challenges, mitigation strategies, outcomes, and areas of intervention

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Abstract

As the online advertising market has grown, issues such as high volume of ads, highly personalised and targeted ads, the role of algorithmic biases, lack of transparency of ad placement, and complex financial flows in the ad tech supply chain have received increased attention in academic and popular literature. Despite concerted efforts within the industry and legislative action at national and international levels, available measures to monitor and detect these challenges are often perceived to lag behind increasing layers of intermediation and ever-increasing footprint of the online platforms.

The aim of this paper is to discuss how a comparative and integrative framework for regulatory oversight of online advertising could be assembled. For this purpose, the paper draws on a literature review of peer-reviewed articles and grey literature to identify the challenges in online advertising, known mitigation strategies, and possible outcomes of the strategies. As part of the initial specification of the framework developed, the paper covers broad categories of market players, type of challenges, mitigation strategies, and intended outcomes for regulatory oversight of online advertising. Additional areas for investigation and potential improvement of the draft framework are also identified.

The ideas discussed in this paper are expected to be of interest to digital economy researchers, policy researchers and policy makers, various players in the online advertising supply chain, public and private sector stakeholders monitoring and investigating the online advertising ecosystem, and anyone interested in balancing the economic gains of online advertising against the challenges it poses to the platform end-users and the wider online platform economy.

Keywords: Online advertising, Online platforms, Platform regulation, Technology policy

1. Introduction

Online advertising (or digital advertising) spending comprising of ads displayed to the end-users (consumers or businesses) of desktop or laptop computers, and mobile phones was worth an estimated US\$ 378 billion worldwide in 2020 (Statista Research Department, 2021). This is expected to reach US\$ 646 billion worldwide by 2024 (Statista Inc, 2021; Statista Research Department, 2021).

As the online advertising market has grown, concerns around issues faced by the end-users, advertisers, and publishers have also increased. Issues such as high volume of ads, highly personalised and targeted ads, the role of algorithmic biases in exacerbating health and wellbeing issues, lack of transparency of ad placement, and complexity of financial flows in the ad tech supply chain have been increasingly discussed in the literature (Adshead et al., 2020; Blass, 2019; Braun and Eklund, 2019; Hajian et al., 2016; Parra-Arnau et al., 2017; Venkatadri et al., 2018). With growing concern around these challenges and high visibility of the market impact of online advertising, unclear reporting on the issues by market players (including platforms, intermediaries, businesses, and consumers) appears to have constrained legislative and regulatory activity (Adshead et al., 2020). Available measures to monitor and detect these challenges are often perceived to lag behind increasing layers of intermediation and ever-increasing footprint of the online platforms.

Although a number of initiatives in the form of self-regulatory practices, platform rules and practices, and media literacy initiatives (to name a few) exist to curb rogue or anti-competitive behaviours in online advertising, their efficacy is yet to be fully understood (Chan, 2021). Legislative and regulatory agencies in the European Union (EU), United States of America (US), China, United Kingdom (UK), and other countries have begun to take notice. For example, the European Commission opened a formal investigation in June 2021 regarding anti-competitive conduct by Google in the online advertising technology sector (Ferrie and Tsoni, 2021). In addition, the EU regulatory framework on online platforms will soon be complemented by the Digital Services Act (DSA) and the Digital Markets Act (DMA). The DSA is intended to protect consumers by increasing the accountability of online platforms and prohibiting illegal content online. It is expected to increase transparency on ad personalisation parameters in online advertising. The DMA is designed to ensure fair competition by establishing rules for gatekeeper platforms. It mandates the gatekeeper platforms to disclose the fees paid by the advertisers and publishers and give them access to the platform's performance measuring tool.

Given the complexity of the online advertising landscape, the jurisdictional variations on the legislative approaches, and the opacity of the supply chain, regulating the ecosystem while enabling market-led innovation to thrive remains an ongoing challenge. Identifying a balanced, proportionate response as part of any market intervention needs to be process-driven to minimise the risk of short-term measures being enacted to address market

provocations. This requires the evidence supporting the interventions to be continually gathered in a structured, iterative manner. When gathering such evidence, the impacts of the prospective interventions on various market players also need to be considered in conjunction with any legislative and regulatory precedents in online advertising as they emerge. The aim of this paper is to discuss how a comparative and integrative framework for regulatory oversight of online advertising could be assembled. Such a framework would facilitate a baseline of understanding in relation to the issues for the different market players (e.g., consumers, advertisers, or publishers), the challenges they face, and the potential impacts of regulatory approaches on online advertising. The framework would enable various market players (including regulatory, legislative agencies and platforms) to identify areas of intervention and consider the mitigation strategies that could target specific issues.

Given the size, scale, and number of market players participating in the online advertising supply chain, developing such a framework would be an ambitious undertaking to ensure it is adaptable, has cross-border applicability, and could lead to consensus on potential reforms to the online advertising market. The framework would need to address a wide range of issues in online advertising; align with prevalent socio-political-economic-legal environments; and adapt to any constraints of the regional jurisdictions in which the online advertising platforms operate. Since such expansive objectives are beyond the scope of this paper, it focuses on the following sub-set of research questions which could prove relevant to assembling a comparative and integrative framework:

- What are the known challenges in online advertising?
- What are the possible mitigation strategies or approaches to address these challenges?
- What are the outcomes targeted by the existing mitigation strategies?
- How to identify the areas of intervention to address the challenges in online advertising?

A number of industry-led, legislative, and regulatory initiatives to address the challenges in online advertising are currently being considered at national and international levels. This paper focuses on the debate in the EU and the UK to facilitate a high-level understanding of the online advertising ecosystem in the context of these research questions. The ideas discussed in this paper are expected to be of interest to digital economy researchers, policy researchers and policy makers, various players in the online advertising supply chain, public and private stakeholders monitoring and investigating the online advertising ecosystem, and anyone interested in balancing the economic gains of online advertising against the challenges it poses to the platform end-users and the wider online platform economy.

The remaining sections in the paper are structured as follows:

- Section 2 describes the research approach for this paper along with key limitations of the methods used.
- Section 3 covers key terms and definitions relevant to the discussion in this paper.

- A high-level description of the broad variety of known challenges in online advertising is provided in section 4.
- Section 5 covers the various mitigation strategies identified in the literature, including technology-based solutions, behavioural and reporting strategies, and existing legislative or regulatory initiatives to address these challenges. Intended outcomes of these strategies and initiatives are also discussed.
- Section 6 brings together the findings to describe an initial schema for regulatory oversight of online advertising. It covers the challenges, strategies, and the intended outcomes to be considered when identifying the areas of intervention.
- Section 7 summarises the analysis and discusses potential steps for extending the draft framework specification for regulatory oversight of online advertising.

2. Research methodology

The evidence base for this paper was identified through a literature review which covered the following analytical threads:

- Known challenges in online advertising;
- Existing mitigation strategies to address the challenges;
- Possible outcomes of the mitigation strategies to address the challenges; and
- Approaches to identifying areas of interventions based on the challenges, strategies, and possible outcomes.

The literature searches were conducted on Google Scholar with supplementary searches done on Scopus and ACM Digital Library (DL) where necessary. The main search terms used to identify relevant literature through Google Scholar, Scopus, and ACM DL included: “online advertis*”, “regulat*”, “challenge*”, “*strateg*”, “mitigat* strateg*”, “techn* solution*”, “behav* change*”, “interven*”, “outcome*”, “impact*”, “UK*”, “United Kingdom”, “European union”, “EU”, “European Commission”, and “EC*”.

The literature searches prioritised peer-reviewed, high-quality literature to form the basis of the analysis presented in the paper. Where relevant, documents and consultations published by regulatory and legislative bodies were considered to ensure a practice-based perspective in the literature review. In particular, the evidence collected in two systematic reviews about online behavioural advertising, Boerman et al. (2017) and Varnali (2021), was used to inform the challenges which the regulatory approaches need to address. Considering the rapid pace of technological change and the constantly changing regulatory landscape, search results from 2014 onwards were prioritised. Since the search strategy relied on manual searches, the articles were identified by screening title, abstract, executive summary, introduction, and findings sections. For articles deemed relevant to the research questions under investigation, the references section was screened to identify additional articles of relevance to the paper.

Additional search terms were identified as part of snowballing the short-listed articles for relevant references.

The evidence collected through this literature review was synthesised using principles of rapid evidence assessment. The authors had three online meetings to discuss emerging insights from the literature review, possible implications of the findings, and approaches to structuring the findings as part of assembling a draft framework for regulatory oversight of online advertising.

Due to the highly targeted nature of literature searches, some caveats need to be considered vis-à-vis the analysis presented in the remaining sections of this paper:

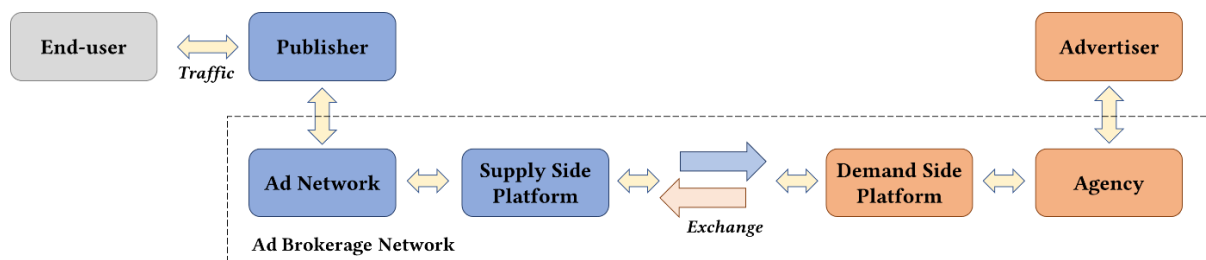
- In the literature online advertising refers to paid-for advertising in the search market (ad listings in search results), open online display market (advertising on publisher websites and mobile phone apps), social display market (advertising on social media services), classified market (ad listings on comparison or aggregator services), and sponsorship or influencer marketing (sponsored content, social media creators promoting products in return for payment) (Adshead et al., 2020; Competition & Markets Authority, 2020). This paper focuses on the open online display market. This is to ensure a concise, focussed discussion on the research questions.
- The literature searches were done manually and relied on the authors' understanding of the topic in selecting relevant articles. Since the searches on Google Scholar, Scopus, and ACM DL were highly targeted, the findings are a high-level snapshot of understanding vis-à-vis the challenges, mitigation strategies, areas of intervention, and possible outcomes. The following discussion is not intended to establish an exhaustive understanding of the challenges and the known mitigation strategies.
- As part of the searches, the results were sorted for relevance and prioritised based on number of citations, and whether the articles were peer-reviewed. The findings therefore rely on academic literature which may lag latest developments in online advertising landscape. Where relevant, recent publications and communications from regulators and stakeholders were also reviewed.
- The draft specification framework identified in this paper is intended to be empirical. As a result, literature discussing theoretical aspects of regulation of online platforms and the online advertising ecosystem was not included in the review process.
- The paper does not consider the impact of traditional, offline advertising practices on online advertising and vice versa. This was done to ensure a concise discussion on the research questions.
- A systematic review of literature is likely to provide further in-depth understanding of, and potentially additional perspectives on the research themes investigated in this paper.
- The paper examines the challenges, outcomes, and impacts of online advertising from a cross-sector, transversal perspective. The role of online advertising in specific areas

i.e. health, obesity, tobacco, gun control, or political advertising is not considered since the aim was to develop a high-level understanding of the research questions under investigation.

3. Key terms and definitions

The following figure depicts the online advertising ecosystem, relations between key market players, and the flows in the ad delivery process at a high-level of abstraction.

Figure 1: The online advertising ecosystem, key market players, and ad flows



Sources: Cai et al. (2020); Dave et al. (2013); and Papadopoulos et al. (2017)

As depicted in the figure above, when an end-user visits a publisher’s webpage, a request for an ad impression (i.e. the ad to be displayed) is sent to the ad exchange via the Supply Side Platform (SSP). This request includes information on the end-user gathered via cookies saved either on the client (i.e. end-user’s mobile device or web browser). If the end-user characteristics match the target audience of the advertiser, the advertiser enters the auction via the Demand Side Platform (DSP). Typically the advertiser with the highest bid wins the ad space and can show its ad on the client. The publisher gets paid for the ad shown on its webpage (or mobile phone application) and the ad intermediaries (DSPs, ad exchanges, and SSPs) receive a fee.¹

The table below provides definitions of the market players in the ecosystem depicted above.

Table 1: Definitions of market players in online advertising

Market player	Definition
End-user	Potential user or buyer of products and services advertised. This may be either a consumer (an individual user) or a business. A limited amount of anonymous data, or non-personally identifiable data, is passed between the browser or the application and the Publisher to help the Publisher identify a machine that has connected to its website via the use of a session cookie.

¹ For a more detailed discussion on the flows in the ad delivery process, see Dave et al. (2013) and Papadopoulos et al. (2017).

Market player	Definition
Publisher	A person or company that makes content (in any form) available for consumption, for free or for sale.
Ad Networks	Organisations that provide an outsourced sales capability for publishers and a means to aggregate inventory and audiences from numerous sources in a single buying opportunity for media buyers. Ad Networks may provide specific technologies to enhance value to both Publishers and Advertisers, including unique targeting capabilities, creative generation, and optimization. Ad Networks' business models and practices may include features that are similar to those offered by Ad Exchanges. Usually, ad networks rely on Content Delivery Networks to server advertising contents.
Supply Side Platforms (SSPs)	Organisations that provide outsourced media selling and ad network management services for publishers. Also known as sell-side platforms. Their business models and practices are similar to Ad Networks. SSPs are typically differentiated from Ad Networks in not providing services for Advertisers. DSPs and Ad Networks often buy from SSPs.
Demand Side Platforms (DSPs)	Organisations that provide centralized (aggregated) media buying from multiple sources including Ad Exchanges, Ad networks, and Supply Side Platforms, often leveraging real-time bidding capabilities of said sources.
Advertiser	A person, organisation, or company that places promotions of a specific product, service, or event in a public medium to attract potential new or repeat customers.
Ad Exchanges	Organisations that provide a sales channel to Publishers and Ad Networks, as well as aggregated inventory to Advertisers. They bring a technology platform that facilitates automated auction-based pricing and buying in real-time. Ad Exchanges' business models and practices may include features that are similar to those offered by Ad Networks.

Sources: Cai et al. (2020) and Interactive Advertising Bureau (2022)

4. Known challenges in online advertising

Online advertising experiences many of the same challenges as advertising in print, television, radio (i.e. traditional media), and other media, such as misleading claims and offensive ad content. However, online advertising has a unique set of characteristics that enable certain of these challenges to be exacerbated, or for other challenges to occur.

Due to the built-in reach and network effects of online platforms, these challenges scale differently, have cross-border presence, and have been subjected to less control and regulation than traditional media ads. As discussed below, these challenges impact advertisers, agencies who procure the ad-space from platforms, and also individual and business consumers which use the platforms in different modes (either free or paid mode).

4.1 Consumers

Online advertising can be delivered at high volumes previously not possible on traditional media. In addition to the scale of online advertising, the ads can be tailored to the individuals. As a result, not only is the shared audience for the ads likely to be very limited but tracking inappropriate or incorrectly targeted ads is also highly challenging (Adshead et al., 2020; Estrada-Jiménez et al., 2019). Related to indiscriminate personalisation of data, other ad content issues include malicious ads, illegal ads, misleading ads, and fake or incorrectly labelled ads. Native advertising is also identified as an issue as consumers cannot always distinguish between legitimate content and targeted ads (Bakshi, 2014; Casale, 2015).

Due to the amount of data collected on consumer activities and preferences online, online platforms can profile their audiences and serve them targeted ads. The issues arising from personalisation or targeted advertising include mis-targeted ads, discriminatory ads, and ads targeting consumer vulnerability (based on personalised data gathered). Although personalisation can increase the relevance of the ads served to consumers, targeted advertising can also influence consumers' purchasing decisions, and can be used for manipulation of consumer decision or opinion. It may prove challenging to differentiate between legitimate persuasion and misleading or aggressive marketing (Directorate-General for Justice and Consumers (European Commission) et al., 2022).

Despite legal requirements for commercial communications, and thus for online advertising, to be clearly recognisable², consumers are often not aware that they receive personalised advertising, or the criteria used to target them. In addition, due to online advertising's reliance on personal data, the potential for misuse of the data to deliver discriminatory messaging or ads targeting vulnerable populations is highly possible. As Carrascosa et al. (2015) discuss, online advertising routinely targets sensitive topics (e.g., religion or health) despite the existence of regulation that bans such practices.

4.2 Businesses

The main challenges faced by businesses in the ad supply chain, particularly by advertisers and publishers, relate to the opacity of financial flows and ad placement, ad fraud, and potential costs of platform switching.

² As per the eCommerce Directive and the Audio-visual media services Directive.

Online advertising is usually traded programmatically via a complexly designed, relatively opaque supply chain. For advertisers and advertising agencies the issues are typically related to the complexity of the supply chain, opacity of the real-time bidding process and intangible nature of ads.

One of the main issues reported by advertisers, publishers and ad intermediaries is the lack of transparency on financial flows and the fees charged by intermediaries. Publishers also report issues related to changes of algorithms that determine auctions and traffic, and lack of publisher access to auction logfiles. On the demand side, advertisers are concerned about the opacity on ad placement, ad viewability, ad fraud and context. In addition, some ad intermediaries point to the lack of common metrics for measuring ad effectiveness and the absence of third-party measurement of large platforms' performance (Lechardoy et al., 2020). Access to raw data on ad performance is lacking as ad intermediaries usually provide data that is already edited and aggregated. This opacity makes it difficult for advertisers to calculate their own unbiased returns on their advertising expenses (Fourberg et al., 2021).

For advertisers and advertising agencies, optimising allocation of ads is crucial due to real-time bidding. Faced with multi-homing consumers, advertisers and publishers may not derive value for money through advertising since the extent to which their ads reach the intended demographic is not clear (D'Annunzio and Russo, 2021).

The lack of transparency in the supply chain opens up a range of issues including not only incalculable value-for-money for advertisers and publishers but also potential for rogue actors to perpetrate fraud and deliver malicious attacks (Adshead et al., 2020). Unlike ads on traditional media, online ads are highly intangible due to dynamic, personalised ad delivery. However, the data trail left behind by online ads poses the risk of subsequent fraud or misrepresentation (Adshead et al., 2020).

The opacity of the ad tech value chain, including the reliance on algorithms and the large number of ad intermediaries, makes the online ad industry rife with fraud. 'Ad fraud' is fraud committed in the delivery of advertising and includes a range of practices used to misrepresent advertising impressions, clicks or conversions in order to generate revenue (Adshead et al., 2019). As a result of ad fraud, advertisers are likely to be charged for advertising that does not actually reach their intended audience.

Advertisers and publishers are also likely to be impacted by ad fraud in the form of fake traffic, fake audience data, fake context, and fake actions (i.e. responses from consumers). Additionally, due to the programmatic nature of the ad market, counterfeit advertising, and potential ad misplacement also poses reputational risks to advertisers and publishers (Adshead et al., 2020).

For advertisers and publishers heavily invested in specific platforms, cost of switching platforms is also a challenge due to the prospect of losing valuable consumer data or converting it into the format for another platform (Tucker, 2019).

4.3 The online advertising market ecosystem

When the challenges across the online advertising market ecosystem are considered, competition issues linked to the dominant positions of online platforms, and the risks to privacy due to ubiquity of personalised, behavioural advertising can be considered the main challenges.

Due to the opaque nature of the supply chain, large vertically integrated platforms can use their dominant position to impose their terms. This can leave advertisers and publishers in the dark regarding the costs, profits and effectiveness of placement of ads. The presence of these platforms both on the supply and demand sides as well as on the tools and analytics segments can help maintain their market power and therefore is likely to favour opacity.

Large online platforms that accumulate a vast inventory, data, and a vertical presence along the ad tech value chain are also likely to engage in tying and bundling practices. For example, advertisers can only buy ad inventory on Search and YouTube programmatically through Google's DSPs. Similarly, the ad inventory on Facebook is only accessible via its ad network. The non-availability of such large and valuable inventories to competing ad intermediation players has the potential to hinder the participation or entry of competitors (Fourberg et al., 2021).

Platforms that are present at different levels of the ad tech supply chain are also in a position to engage in self-preferencing. For example, as a market leading search engine, Google has an incentive to allocate ads using its buy-side ad tools to its own owned and operated properties (e.g. Google search results, YouTube). In such a scenario Google can receive the whole advertising budget without intermediation fee, while if Google buy-side tools place an ad on a third-party website, Google can receive a share of the ad spend but needs to pay traffic acquisition costs (TAC) to the publisher (Lechardoy et al., 2020). Google annual reports show that the proportion of Google's advertising revenue going to its owned and operated properties has increased from 64% in 2007 to 82% in 2018 (Geradin and Katsifis, 2020). Whether this pattern of revenue growth correlates with any predatory self-preferencing on Google's part is however yet to be fully established.

In addition, the role of browsers and mobile devices also raises questions about the extent to which online advertising intermediation is competitive. For example, the market share of Google's browser Chrome and the Android operating system could be leveraged to entrench its leading position in online display advertising intermediation. Google's decision to phase out third-party cookies on Chrome may prevent rival ad tech companies from implementing their own advertising solutions while the first party cookies collected on Google's own and operated inventory continue to enable detailed targeting only available through Google's DSP (Australian Competition & Consumer Commission, 2019). Similar concerns have led the UK Competition and Markets Authority (CMA) to launch an investigation against Meta (formerly Facebook) in June 2021. CMA is examining whether Meta has unfairly leveraged

the data gained from its advertising services and single sign-on (Facebook Login, which offers people the ability to sign into other websites, apps and services using their Facebook log-in details) to benefit its own services, in particular Facebook Marketplace and Facebook Dating (Competition & Markets Authority, 2021).

Alcobendas et al. (2021) identify blocking of third-party cookies as an issue that not only strengthens the intermediaries (thereby increasing the complexity of the supply chain), but also raises the spectre of the publishers losing revenue and having reduced visibility of ad reach and penetration. For example, a study from Google shows that disabling access to third-party cookies can result in approximately 52% less revenue for publishers (Google, 2019). In the interim, the large online platforms can continue to have access to first-party cookies on their owned and operated websites, increasing their competitive advantage. According to publisher representatives and experts, this could lead advertisers to shift to the online platforms' ad tools where first-party tracking still enables audience targeting, further cementing their domination in the ad tech market, while publishers may have to go back to more contextual targeting (Lechardoy et al., 2020).

Due to the near-normalisation of behavioural advertising, concerns about privacy have increased along with growing perception that the usefulness and trustworthiness of the ads has decreased (Boerman et al., 2017). Although collecting and processing personal data for advertising purposes should be based on prior consent of the data subject as per the General Data Protection Regulation (GDPR), consumers appear to have very limited understanding of who is collecting their data, what data is collected, and how it is processed. In addition, the prior and informed consent of consumers is often likely to be hindered by the use of dark patterns (such as default choices, trick questions, or false hierarchy of options) in the cookie consent form (Directorate-General for Justice and Consumers (European Commission) et al., 2022). This may lead consumers to accept cookies without much forethought just to be able to browse the page. Advertising auctions in real time bidding (RTB) also involve large transfer of data between different ad tech players without the participating consumers' knowledge. Often consumers have no knowledge of who the data is shared with and whether it is used in contexts other than advertising. In this regard, in February 2019 the German Bundeskartellamt³ prohibited Facebook from combining end-user data between subsidiaries of the Facebook Group (Bundeskartellamt, 2019).

Publishers and advertisers have also expressed concerns that privacy legislation (such as GDPR) may have been used by large gatekeeper platforms to limit the sharing of end-user data with publishers and advertisers, restrict interoperability and the flow of data, thus consolidating their walled gardens (Geradin et al., 2020; Lechardoy et al., 2020). Platforms that have end-user facing services and also act as ad tech intermediaries can access extensive amounts of data. Such vertically-integrated platforms may choose to only provide aggregated

³ Bundeskartellamt i.e. the Federal Cartel Office is Germany's national competition regulatory agency.

and anonymised data to publishers using their ad services (Geradin et al., 2020). Effectively, large ad tech players can not only bundle access to the data with the purchase of advertising solutions and services but may also prohibit or hinder the use of the data via a competitors' advertising services (Autorité de la concurrence, 2018; Srinivasan, 2020).

5. Existing strategies to mitigate the challenges in online advertising and their intended outcomes

To mitigate the impacts of these challenges at the level of consumers and from the perspective of advertisers and publishers, several strategies drawing on technology solutions, behavioural changes in end-users, and processes for redressal of online advertising issues have been identified. The next sub-section covers the key characteristics of these non-regulatory strategies and the outcomes they target before discussing the legislative and regulatory initiatives.

5.1 Non-regulatory strategies

When the technology-focussed mitigation strategies are considered, Cai et al. (2020) identify a range of offline and online countermeasures that could help mitigate security issues (including overt personalisation, theft of data, and ad hijacking) faced by consumers. Offline countermeasures prevent and detect the security issues prior or after the advertising delivery process. Possible examples include the use of machine learning-based data analytics techniques to detect ad fraud and malvertising; static analysis of mobile applications, mobile advertising Software Development Kits (SDKs), and malicious executables to detect presence of malvertising; and the use of game theory to analyse the interactions between different players in the advertising ecosystem and identify potential issues in the ad transaction between the publishers, ad network, and advertisers. Online countermeasures aim at eliminating security issues during the ad delivery process. Possible examples include, detecting malvertising, ad fraud and ad hijacking in web browsers and mobile applications (i.e. the clients through which ads are delivered); developing client and server cooperation architectures to enable ad integrity to be verified effectively; and identifying malicious ads through network monitoring and intrusion detection systems (IDSs).

Ad-blocking on browsers and mobile devices are also possible client-side technical solutions as described by Bashir et al. (2018) and Estrada-Jiménez et al. (2019). However, despite the perceived simplicity and infallibility of ad-blocking, tracking companies have started exploiting WebSockets (a real-time bidirectional communications protocol similar to the Hypertext Transfer Protocol Secure i.e. HTTPS) to extract end-user data and enable harvesting of consumer data for personalisation (Bashir et al., 2018). As per Alcobendas et al. (2021), blocking of third-party cookies as implemented by Apple and Mozilla can enable end-

users to opt out of targeted advertising. This potentially limits the ability of the DSPs to use the cookie identifiers for end-user participation and bidding decisions.

Estrada-Jiménez et al. (2019) also identify potential modifications to the real-time bidding processes to regulate the distribution of personal data from the ad exchange to DSPs to bar dishonest intermediaries from participating in the auctions to curtail harmful behaviour while maximising revenue for ad exchanges. However, the extent to which such an approach would see industry adoption, particularly by DSPs, is not clear.

Approaches which are primarily technology-focussed while drawing on active end-user participation include: incorporating trusted third-parties to intermediate the communication between end-users and advertising players to encrypt or obfuscate end-user data (Backes et al., 2012); changes to advertising architectures where exploitation and sharing of data is localised to the client side (i.e. web browsers and mobile devices) (Fredrikson and Livshits, 2010; Guha et al., 2011; Toubiana et al., 2010); protocols to exploit personal data while auctioning end-user impressions without revealing any personal preferences (Helsloot et al., 2018, 2017); and the Interactive Advertising Bureau's (IAB) Transparency and Consent Framework (Interactive Advertising Bureau Europe, 2019)

In addition to these technology-based solutions, Adshead et al. (2020) and Estrada-Jiménez et al. (2019) also identify possible behavioural changes and reporting processes which could enable issues in online advertising to be reported and redressal to be sought. These solutions include: an in-built mechanism in ad delivery to report incorrect or misleading ads (e.g. the Ad Choices logo); platform enabled reporting mechanism for ad-related issues (Google, 2022; Instagram, 2022); reporting incorrect, misleading, or offensive ads to regional advertising regulation agencies such as the Advertising Standards Authority (ASA) in the UK or industry self-regulation bodies such as the European Advertising Standards Alliance (EASA) (Advertising Standards Authority | Committee of Advertising Practice, 2022); reporting the ads to sector-specific ombudsman or bodies (e.g., the Financial Conduct Authority i.e. FCA, the Information Commissioner's Office i.e. ICO, ActionFraud, and Citizens Advice in the UK); creating financial incentives for end-users in lieu of sharing data (Brave Software Inc, 2022; Parra-Arnau, 2017); and enabling advertising players to charge end-users for not tracking them.⁴

Fourberg et al. (2021) highlight that often consumers do not submit complaints, nor do they seek redress to courts when targeted advertising infringes their rights. This is likely to be due to the consumers' lack of knowledge of the consumer protection framework applicable to online advertising, the low value of the case, the complexity of the litigation process with the time and cost involved, the lack of knowledge of the person responsible for the advertising,

⁴ <https://drive.google.com/file/d/0BzwYn5IpP3wtdW93NDJzSmt5a1k/view?usp=sharing> (Access requires a Google login and subject to permission being granted for view).

or the symbolic outcome that may be expected (injunction deciding the stopping of an advertising campaign already finished months before the judgement) (Fourberg et al., 2021).

Despite the availability and potential utility of these approaches, some of them would require modifications to the incumbent online advertising models i.e. the way end-user data is used or how economic value is obtained from it (Estrada-Jiménez et al., 2019). Vis-à-vis behavioural or reporting approaches, variety of reporting mechanisms and the steps required to go through them, and lack of clarity on outcomes are key challenges in end-user participation (Adshead et al., 2020). Although media literacy campaigns have a role to play, given the reach and scale of advertising platforms, their efficacy in effecting a change is likely to be incremental rather than decisive at the ecosystem-level (Adshead et al., 2020).

The non-regulatory strategies are intended to give individual consumers and businesses leverage in reporting and potentially curtailing ad fraud, misdirection, or privacy intrusive personalisation. These strategies often focus on the end-user's experience of online advertising, increasing their awareness of the nature of ads they see, giving them choice to select the ads they prefer, providing opportunities for seeking redress, and thereby offer them a degree of protection from rogue or malicious actors. Strategies such as trusted third parties or potential technical changes to real-time bidding processes have implications for the advertisers, agencies, DSPs, publishers, ad exchanges, ad networks, and SSPs by making the ad marketplace more equitable and competitive in commercial terms. However, the extent to which these approaches effectively scale at a market-level or enable the challenges to be addressed across the online platform ecosystem is not yet fully understood. In this context, examining existing legislative and regulatory initiatives is highly relevant.

5.2 Legislative and regulatory initiatives

When the existing legislative and regulatory initiatives to mitigate challenges in online advertising are considered, these strategies appear to be focussed on reducing ad fraud, limiting mis-targeted, discriminatory ads, ensuring fair competition in the market, and ensuring equitable relations between the market players. These strategies seem aimed at mitigating the challenges across a spectrum of market players including consumers, businesses, and the ad market ecosystem.

5.2.1 Consumers

Vis-à-vis consumers, existing legislation and regulation is aimed to ensure that advertisement and communication are clearly recognisable, and to prohibit misleading and aggressive practices arising from online advertising. The most relevant pieces of legislation and regulation in this context are the eCommerce Directive 2000/31, ePrivacy Directive 2002/58, the Audio-Visual Media Services Directive (AVMSD), Misleading and Comparative Advertising Directive (MCAD), Unfair Commercial Practices Directive (UCPD), and the Digital Services Act (DSA).

Article 6 of the eCommerce Directive 2000/31⁵ requires that commercial communications which are part of, or constitute an information society services, shall be clearly identifiable as such, and the natural or legal person on whose behalf the commercial communication is made shall be clearly identifiable. Similarly, Article 7(2) of the Unfair Commercial Practices Directive 2005/29/EC (UCPD)⁶ regards as a misleading omission when the trader fails to identify the intent of the commercial practice, and this causes or is likely to cause the average consumer to take a transactional decision that they would have not taken otherwise. Annex 1 of the UCPD prohibits one practice related to online advertising, namely ‘using editorial content in the media to promote a product where a trader has paid for the promotion without making that clear in the content or by images or sounds clearly identifiable by the consumer’ (Practice 11). Besides, the Audio-visual Media Services Directive 2018/1808 (AVMSD)⁷ sets out that advertising shall be readily recognisable and distinguishable from editorial content and bans surreptitious commercial communications and subliminal techniques. These different provisions require platforms and traders to enable consumers to recognise advertising, however there is no obligation to inform end-users that they are receiving targeted advertising or about the parameters used to serve them the ads.

In addition, Article 13 of the ePrivacy Directive 2002/58⁸ provides that the use of emails direct marketing may only be allowed in respect of subscribers who have given their prior consent and prohibits marketing emails disguising or concealing the identity of the sender.

Regarding the content of the advertising, Article 9 of the AVMSD prohibits specific harmful, discriminatory and prejudicial adverts on television and video media services such as video sharing platforms, thus affecting online advertising. The revised AVMS Directive specifies that personal data of minors collected or generated by video-sharing platform providers shall not be processed for commercial purposes, such as direct marketing, profiling, and behaviourally targeted advertising (Article 28b 3). Moreover, targeted advertising shall neither be misleading as per the UCPD and the Misleading and Comparative Advertising Directive 2006/114 (MCAD), nor unfair or aggressive as per the UCPD.

Some provisions of Article 9 of the UCPD could help determine whether targeted advertising is an aggressive practice, for example the use of harassment linked to the timing, location or persistence of the ads, or undue influence linked with the asymmetry of information between

⁵ Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market (Directive on electronic commerce)

⁶ Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market (Unfair Commercial Practices Directive)

⁷ Directive (EU) 2018/1808 of the European Parliament and of the Council of 14 November 2018 amending Directive 2010/13/EU on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services (Audiovisual Media Services Directive)

⁸ 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 on privacy and electronic communications)

the trader and consumer, but also “*the exploitation by the trader of any specific misfortune or circumstance of such gravity as to impair the consumer’s judgement, of which the trader is aware, to influence the consumer’s decision with regard to the product*” which refers to the exploitation of vulnerabilities of the consumer. However, to be considered an aggressive practice as per Article 8 of the UCPD, the use of harassment, undue influence or exploitation of vulnerability shall impair the consumer’s decision and cause them to take a transactional decision they would not have taken otherwise, and these two conditions are more difficult to evaluate (Directorate-General for Justice and Consumers (European Commission) et al., 2022).

In addition, despite the provisions of the ePrivacy Directive, around 50% of worldwide email traffic in Q2 2020 was spam (Kaspersky, 2020). As both legitimate advertising and spam are increasingly personalised and targeted, some end-users struggle to correctly identify phishing and fraudulent messages.

The Digital Services Act (DSA)⁹ introduces additional transparency requirements to inform consumers on the parameters used to serve them online advertising as well as the possibility to oppose the processing of their personal data for advertising purposes. Namely, Article 24 of the DSA requires online platforms that display advertising on their online interfaces to ensure that the recipients of the service can identify in a clear, concise, and unambiguous manner and in real time that the information displayed is an online advertisement, as well as meaningful information about the parameters used to determine the recipient to whom the advertisement is displayed. The European Parliament introduced in an amendment to the DSA that online platforms shall ensure that recipients of services can easily make an informed choice on whether to consent in processing their personal data for the purposes of advertising, and can refuse consent as easily as to accept it with other fair and reasonable options to access the online platform if they refuse consent.¹⁰ In addition, the DSA prohibits targeting or amplification techniques that process, reveal or infer personal data of minors for the purpose of displaying advertisements.

The DSA also requires very large online platforms that display advertising on their online interfaces to compile and make publicly available and searchable a repository containing information on the advertisements displayed (including its content, brand, whether the ad was targeted and the targeting parameters. In Article 36, the Commission shall encourage and facilitate the drawing up of voluntary codes of conduct at EU level to contribute to further transparency for all actors in the online advertising ecosystem.

⁹ Proposal for a regulation of the European Parliament and of the Council on a Single Market For Digital Services (Digital Services Act).

¹⁰ European Parliament. Amendments adopted by the European Parliament on 20 January 2022 on the proposal for a regulation of the European Parliament and of the Council on a Single Market For Digital Services (Digital Services Act). Available at: https://www.europarl.europa.eu/doceo/document/TA-9-2022-0014_EN.html

Overall, the DSA is intended to enable consumers to be informed when they are exposed to targeted advertising, to understand the underlying personalisation parameters, and to be able to refuse that their data is processed for advertising purposes without being penalised in their access to the online platform. In parallel, the repository obligation is expected to provide information to enforcement authorities and researchers to better understand and monitor the online advertising market. However, only the very large online platform will be subject to the repository obligations. The DSA does not apply to all ‘information society services’ covered by the eCommerce Directive. It is limited to online platforms in the case of the advertising provisions, which means that search engines and many online publishers will not be covered by these requirements.

5.2.2 Businesses

Existing legislation and regulation vis-à-vis businesses mainly focusses on identifying rules to ensure increased transparency in the transactions between businesses and the platforms, identifying and addressing discriminatory self-preferencing, and defining gatekeeper behaviour in relation to online advertising. The most relevant pieces of legislation and regulation in this context are the Platform to Business (P2B) Regulation 2019/1150, and the Digital Markets Act (DMA).

The Platform to Business Regulation 2019/1150¹¹ (P2B Regulation) requires online platforms to be transparent towards their business users regarding their respective access and possible use of personal data or other data provided by business users and consumers or generated through the service provision. The terms and conditions must indicate, when applicable, the categories of the data concerned by such accesses and the conditions under which such accesses are proposed. However, the P2B Regulation does not apply to online advertising tools or online advertising exchanges which are not provided with the aim of the facilitating the initiation of direct transactions and which do not involve a contractual relationship with consumers, as the consumers do not use the online services for the specific purpose of finding advertisement and is not able to choose which advertisements they see.¹²

The DMA defines criteria to consider an online platform as gatekeeper and will apply to the gatekeeper of advertising services which also provides one of the following so-called core platform services: Business-to-consumer (B2C) intermediation services (including marketplaces and app stores), search engines, social networks, video-sharing platforms, communication services, cloud computing, or operating systems (desktop or mobile). Online platforms designated as gatekeeper for one or several Core Platforms Services will be subject to several obligations and prohibitions including some related to online advertising. Namely,

¹¹ Regulation (EU) 2019/1150 of the European Parliament and of the Council of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services

¹² Commission Staff Working Document Impact Assessment Annexes Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on promoting fairness and transparency for business users of online intermediation services

the DMA requires gatekeepers of advertising services to provide advertisers and publishers with information concerning the price paid by the advertiser and publisher and remuneration paid to the publisher¹³ and to provide advertisers and publishers, free of charge, access to the performance measuring tools of the gatekeeper and the information necessary to carry out their own independent verification of the ad inventory.¹⁴ These provisions directly address some of the concerns regarding the opacity of fees in the ad intermediation chain and the lack of transparency on performance measurement. However, the disclosure of prices and fees does not address the opacity of the ad auction system and how the resulting prices are calculated, or which other factors are considered in the auction process and the respective importance of these factors.

In addition, the DMA introduces the requirement for gatekeepers to submit to the Commission an independently audited description of consumer profiling techniques used.¹⁵ This is intended to increase transparency and competition between ad tech players, also aiming to prevent deep consumer profiling from becoming the industry standard.

The DMA also addresses the concern on tying and bundling to some extent, as Article 5(f) stipulates that a gatekeeper shall “*refrain from requiring business users or end users to subscribe to or register with any other core platform services*”. This is intended to prevent gatekeepers from jointly marketing/selling multiple core services for which it has been designated as being in a gatekeeper position.

5.2.3 The online advertising market ecosystem

When considering the legislative and regulatory approaches across the online advertising market, the EU focus appears to have been on ensuring fair competition in the internal market, preventing abuse of dominant position in a specific market, ensuring data protection and privacy legislation, and establishing equitable relations between online platforms, ad tech intermediaries, publishers, advertisers, and consumers. The most relevant pieces of legislation and regulation in this context are the Treaty on the Functioning of the European Union (TFEU), existing provisions of the EU Anti-trust law, GDPR, and the ePrivacy Directive.

Article 101 of the TFEU¹⁶ prohibits anticompetitive agreements and decisions of associations of undertakings (cartel) that prevent, restrict, or distort competition within the EU's Single Market. Article 102 of the TFEU¹⁷ prohibits the abuse of a dominant position. The implementation of these provisions is defined in the Antitrust Regulation (Council

¹³ DMA proposal, Article 5 (Article 5.g). Such lack of transparency is currently investigated in the Google AdTech case, Cases AT. 40 660 and 40 670

¹⁴ DMA proposal, Article 6(1)(g).

¹⁵ DMA proposal, Article 13 and recital 61.

¹⁶ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:12008E101:EN:HTML>

¹⁷ <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:12008E102>

Regulation No 1/2003¹⁸), which can also be applied by the national competition authorities. Article 11(6) of the Antitrust Regulation provides that the opening of proceedings by the Commission relieves the competition authorities of the Member States of their competence to also apply EU competition rules to the practices concerned.

As a result of the challenges arising from tying and bundling practice, self-preferencing, ad fraud, and the implications of third-party cookie blocking for publishers, in June 2021 the European Commission opened a formal antitrust investigation to assess whether Google has violated EU competition rules by favouring its own online display advertising technology services in the ad tech supply chain (European Commission, 2021). As part of its in-depth investigation, the Commission intends to examine:

- The obligation to use Google's services Display & Video 360 ('DV360') and/or Google Ads to purchase online display advertisements on YouTube.
- The obligation to use Google Ad Manager to serve online display advertisements on YouTube, and potential restrictions placed by Google on the way in which services competing with Google Ad Manager are able to serve online display advertisements on YouTube.
- The apparent favouring of Google's ad exchange "AdX" by DV360 and/or Google Ads and the potential favouring of DV360 and/or Google Ads by AdX.
- The restrictions placed by Google on the ability of third parties, such as advertisers, publishers or competing online display advertising intermediaries, to access data about end-user identity or end-user behaviour, which is available to Google's own advertising intermediation services, including the Doubleclick ID.
- Google's announced plans to prohibit the placement of third party 'cookies' on Chrome and replace them with the "Privacy Sandbox" set of tools, including the effects on online display advertising and online display advertising intermediation markets.
- Google's announced plans to stop making the advertising identifier available to third parties on Android smart mobile devices when an end-user opts out of personalised advertising, and the effects on online display advertising and online display advertising intermediation markets.

The above practices investigated may breach EU competition rules on anticompetitive agreements between companies (Article 101 of the TFEU) and/or on the abuse of a dominant position (Article 102 TFEU). In addition, the Commission investigation will consider the respect of the GDPR provisions.

In May 2022, the UK CMA launched a similar probe to investigate whether Google has misused its dominant position in the parts of the ad tech value chain where it is the largest

¹⁸ <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32003R0001>

provider, namely DSP, ad exchange and publisher ad server (Competition & Markets Authority, 2022).

In addition, in March 2022, the European Commission launched a competition investigation into whether Google and Meta had violated EU antitrust law in their use of online display advertising. The EU investigation will focus on the so-called 'Jedi-Blue' agreement that saw Meta's Audience Network tool (which bids for ad space on behalf of third party publishers, such as apps) join Google's Open Bidding programme, which allows for real-time auctions on ad space and Google. The inquiry will investigate whether the two companies colluded to exclude ad tech services competing with Google's Open Bidding programme and therefore restrict or distort competition in the online advertising market. On the same day, the UK CMA launched its own probe into the Jedi-Blue agreement with the similar objective of assessing whether Google has abused its dominant position to undermine header bidding, an ad-buying method that allows publishers to offer their ad space to multiple bidders simultaneously rather than sequentially and poses a threat to Google. The inquiries also echo a suit filed in the United States in 2020 and updated earlier this year on an alleged illegal deal between the two companies regarding ad service bidding (Killeen, 2022). Vis-à-vis personalised advertising, the processing of the consumers' personal data needs to comply with the GDPR, and in particular, the consumers need to give consent for such processing and use of their data. The Article 29 Working Party¹⁹ considers that when the data controller uses profiling techniques, the data subject must be informed about this profiling. In addition, if the data subject exercises the right of access, they must be able to obtain details concerning segments that they have been placed into (Article 29 Data Protection Working Party, 2018).

Article 22 of the GDPR provides that data subjects may object to decisions based on solely automated processing that have a legal or a similarly significant effect on them. While it is clear that targeted advertising is a technique using solely automated processing, the GDPR leaves doubt as to whether Article 22 applies to targeted advertising, as it is unclear whether it can entail a decision and have similar legal effects on data subjects. In the Guidelines on Automated individual decision-making and Profiling (Article 29 Data Protection Working Party, 2018), Article 29 Working Party states that in many cases targeted advertising does not have similarly significant effects, except upon specific circumstances of the case, including:

- The intrusiveness of the profiling process, including the tracking of individuals across different websites, devices and services;
- The expectations and wishes of the individuals concerned;
- The way the advert is delivered; or
- Using knowledge of the vulnerabilities of the data subjects targeted.

¹⁹ The Article 29 Working Party was established under Article 29 of the Data Protection Directive (95/46/EC) as an independent EU advisory body on data protection. The GDPR replaced the Working Party by the European Data Protection Board (EDPB).

In such cases, the data controller must provide meaningful information about the logic involved by the processing while the right of access of the data subject enables them to obtain information on the parameters used and their weight (Article 29 Data Protection Working Party, 2018). In any case, targeted advertising based on automated processing remains allowed if the data subject has given explicit consent.

The Directive on Privacy and Electronic Communications 2002/58/EC (ePrivacy Directive) sets out rules for providers of electronic communication services, such as telecoms companies and internet service providers on how to manage their subscribers' data. The ePrivacy Directive requires that end-users are provided with clear and comprehensive information on the placing of cookies or other forms of digital technology designed to store information or to gain access to information stored in the terminal equipment of a subscriber. In this case, end-users also need to be informed about the purposes of the processing and are offered a right to refuse cookies (Article 4(3)). In line with Article 13, subscribers may only receive direct marketing emails if they have given their prior consent and may object to receiving such marketing material at the occasion of any message. In addition, the practice of sending direct marketing emails disguising or concealing the identity of the sender (spam) is prohibited.

Overall, stakeholders such as publishers, intermediary, and experts suggest that the use of privacy legislation to restrict interoperability and the flow of data, may come from the interpretation of the GDPR and its lack of effective enforcement by data protection authorities (Fourberg et al., 2021; Geradin et al., 2020; and Lechardoy et al., 2020). In March 2020, the browser company Brave Software Inc. filed a formal complaint with the Irish Data Protection Commission against Google for infringing Article 5(1)b of the GDPR, which sets that *“personal data shall be collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes”*. According to Brave Software Inc's analysis, the extent of reuse of personal data between Google's businesses and products infringes the “purpose limitation” principle (Brave, 2020).

Furthermore, the European Parliament Resolution on GDPR implementation (European Parliament, 2021) points to the lack and uneven enforcement of the GDPR by National Data Protection Authorities across the EU, which is due, in part, to lack of human, technical and financial resources. The Parliament Resolution points to weak enforcement in cross-border complaints and expressed concerns over the functioning of the one-stop-shop mechanism with the role of the Irish and Luxembourg Data Protection Acts (DPAs) for the cases of the large tech companies registered in those countries.

To adapt the ePrivacy Directive to the technological developments and better align it with the GDPR, the Commission adopted a proposal for an ePrivacy Regulation²⁰ in 2017, still

²⁰ European Commission, 2017, Proposal for a Regulation of the European Parliament and of the Council concerning the respect for private life and the protection of personal data in electronic communications and repealing Directive 2002/58/EC, COM/2017/010 final 2017/0003 (COD).

under discussions between the European Parliament and the Council. The ePrivacy Regulation would apply to new players providing electronic communications services (e.g., WhatsApp, Facebook Messenger, or Skype), would require prior consent of the end-user to collect information on the terminal equipment and to use processing and storage capabilities of terminal equipment, and would introduce more end-user friendly rules using browser settings to easily accept or refuse tracking cookies and other identifiers. While the ePrivacy Directive applies to the placing and accessing to cookies on terminal equipment, the subsequent processing operation of personal data will trigger the application of the GDPR rules, basing the processing of data on one of the lawful grounds set out in Article 6. Namely, targeted advertising is lawful based on prior consent of the data subject but the Article 29 Working Party and its successor the European Data Protection Board (EDPB) have considered that the legitimate interest and performance of a contract were not legal grounds for targeted advertising based on intrusive profiling.

In contrast to the non-regulatory strategies which target specific types of consumers, business, or platform services, the regulatory and legislative initiatives appear more focussed on ensuring a sustainable online advertising ecosystem as an outcome. Amongst the initiatives discussed, the long-term consequences of the DSA and DMA for the online platform economy and the online advertising ecosystem are yet to be understood. Consumer protection is key to GDPR and ePrivacy Directive's functioning with an equal emphasis to ensuring a thriving business ecosystem. Initiatives such as the eCommerce Directive, UCPD, or the P2B regulation are not specifically targeted at online advertising. Depending on how the market players respond to the execution of these initiatives in the long-term, in the context of online advertising, more equitable commercial returns for advertisers, agencies, DSPs, and publishers; increased competition in the ad exchange network by identifying gatekeepers; and sustaining growth in the overall online advertising market turnover could be considered as the potential outcomes of the various initiatives discussed in this section.

6. Identifying the areas of intervention

The complexity of the online advertisement ecosystem poses multiple challenges that may require different types of interventions. Although there are ongoing efforts to mitigate these challenges through legislative and regulatory initiatives, and non-regulatory strategies, the intended and unintended outcomes of the any planned interventions need to be examined in relation to the market players involved, the challenges targeted, and the potential impacts of the interventions.

Given such a scenario, examining the two systematic reviews by Boerman et al. (2017) and Varnali (2021) is instructive to identify the areas of intervention when developing the proposed integrative and comparative framework. Although other studies identifying legislative and regulatory initiatives exist, this paper focuses on Boerman et al. (2017) and

Varnali (2021) due to the extensive, systematic nature of the literature examined and the breadth to which these studies cover the market players and the challenges. Boerman et al.'s (2017) findings relate to the consumers responses to online advertisement. They conclude that these responses or outcomes are driven by advertiser-controlled factors and consumer-controlled factors. This review has been further extended by Varnali (2021) who identifies a three-layered structure applicable to online behavioural advertising. This three-layered structure includes: (i) the ethical and regulatory issues; (ii) strategies that optimise the welfare of the system as a whole; and (iii) effectiveness of a single advertiser's campaign.

When online advertising flows are considered, Boerman et al. (2017) identify challenges pertaining to ad characteristics i.e. ad formats, placements, audience segmentation and accuracy as supply-controlled factors. Challenges pertaining to degree of personalisation of ads, privacy concerns, perceived risks of online ads, usefulness and trustworthiness of ads (amongst others) are described as demand-controlled factors by Boerman et al. (2017). More specifically, the supply-controlled factors include (i) the ad characteristics, or the factors which are part of the ad itself and which can differ among different online behavioural ads; and (ii) the forms of transparency which advertisers use to communicate that an ad is based on online behaviour. These forms of transparency involve information that often accompanies an ad (e.g., an additional logo or privacy statement), which some self-regulatory bodies require for online behavioural advertising (OBA). The consumer-controlled factors include (i) a cognitive aspect, including people's knowledge and abilities with respect to OBA; (ii) an affective aspect, including people's perceptions of OBA in general or of a specific ad; and (iii) personal characteristics, such as a person's age or desire for privacy. Each factor includes different drivers and inhibitors. These factors, supported by empirical evidence, can be used to understand consumer responses to online advertisement and illustrate their interconnectedness.

Although Boerman et al. (2017) and Varnali (2021) are mainly focussed on online behavioural advertising, the findings can be extended to the broader online advertising landscape. The concepts of supply-controlled and consumer-controlled factors can be generalised as supply-side and demand-side factors that influence the challenges in online advertising and the mitigation strategies discussed in sections 4 and 5. Drawing on Boerman et al. (2017), the supply-side factors would relate to the role of advertisers and publishers (e.g. in defining the ad characteristics, audience segmentation etc), while the demand-side factors would relate to the consumers' perception and reactions to ads.

When identifying the areas for intervention three levels of market players can be discerned:

- Consumers;
- Businesses, primarily advertisers, agencies and publishers that are part of the ad supply chain; and

- The online advertising market ecosystem including not only the consumers and the businesses but also the intermediaries (i.e. the ad exchanges, ad networks, and SSPs), the platforms, and the society.

Similarly, for the research questions covered three broad categories of challenges regarding online advertising can be identified:

- Challenges regarding advertisement flows, e.g., ad fraud, targeted and discriminatory ads, and intrusive personalisation;
- Challenges regarding resilience of ad supply chain and participating market players, e.g., ad supply chain structures; profitability and sustainability of advertisers, agencies, DSPs, publishers, ad exchanges, ad networks, and SSPs; and
- Challenges regarding ethics of online ads and competitiveness of the online advertisement market ecosystem.

The mitigation strategies can be broadly categorised as:

- Technology-based, behavioural change-led strategies; and
- Legislative and regulatory initiatives.

Boerman et al. (2017) also discuss outcomes in terms of consumers' responses to online advertisement with respect to (i) the actual advertising effects, such as purchases and click-through rates, and (ii) the degree to which people accept or avoid online advertisement. These relate to not only the effective reach of online ads to targeted demographics but also economic contributions to various market players, including advertisers, agencies, and the intermediaries. Drawing on the discussion in the previous section, when considered across the online advertising ecosystem, the intended outcomes of any mitigation strategies can be broadly typified as:

- Enhanced consumer awareness and protection;
- Increased competition in the online advertising market ecosystem;
- Improved market reach and effectiveness of online advertising;
- Increased commercial returns of online advertising to advertisers, agencies, DSPs, and publishers, ad exchanges, ad networks, and SSPs; and
- Growth in the online advertising market turnover.

Identifying any intervention in the online advertising market requires consideration to the interconnectedness between the market players, the type of challenge being considered, the nature of mitigation strategies being employed, and the intended outcomes. This leads us to envision the following schema to identify the areas of intervention. The values in the table below (in *italics*) use the high-level descriptors for each aspect of the decision-making process and are only intended for illustration purposes.

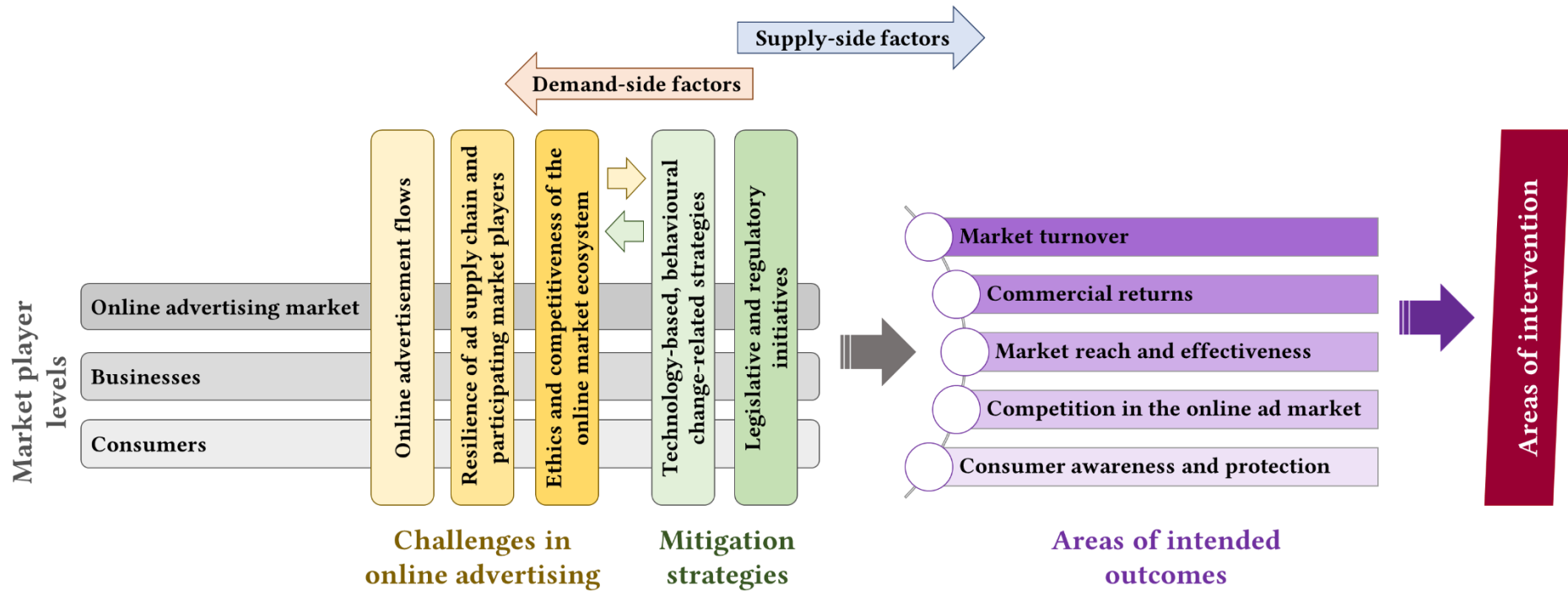
Table 2: Draft schema for identifying the areas of intervention

Targeted market player(s)	Challenge(s) being addressed	Relevant mitigation strategies	Intended outcome(s)	Area(s) of intervention
<i>Consumers</i>	<i>Advertisement flows</i>	<i>Technology-based, behavioural change-led strategies</i>	<i>Improved effectiveness of the online ads</i>	<i>To be identified</i>
<i>Advertisers</i>	<i>Resilience of ad supply chain: profitability of advertisers</i>	<i>Regulatory initiatives</i>	<i>Increased commercial returns for advertisers and agencies</i>	<i>To be identified</i>
<i>Ad tech networks</i>	<i>Competitiveness of the online advertising market</i>	<i>Legislative initiatives</i>	<i>Increased competition in the online advertising market</i>	<i>To be identified</i>
<i>...</i>	<i>...</i>	<i>...</i>	<i>...</i>	<i>...</i>

Source: Author elaboration

The following figure (see the next page) depicts how these elements would come together to identify the areas of intervention when building a comparative and integrative framework for oversight of online advertising market developments and activities.

Figure 2: Identifying the areas of intervention in online advertising



Source: Author illustration

For any areas of intervention identified on the basis of such a framework, an impact assessment of the intended and unintended outcomes of the intervention would be necessary. As a consequence, as currently described, the framework is a draft specification rather than a final, fully developed version. A systematic, structured investigation of the impacts would need to be incorporated in the framework before it can be considered useful in practice. In the concluding section the implications of this initial framework design and the potential steps for developing it further are discussed.

7. Discussion and scope for further development

This paper provides an initial specification of a comparative and integrative framework for regulatory oversight of online advertising. The evidence for developing the framework was based on a literature review of academic and grey literature (including regulatory consultations and policy reports). As part of the evidence different market players in the online advertising ecosystem, the known challenges in online advertising, existing mitigation strategies to address the challenges, and intended outcomes of these strategies were considered. This evidence was used to arrive at a schema for identifying the areas of intervention as part of regulatory oversight of online advertising. This section discusses the findings in brief and identifies some potential steps for developing the framework further.

When the main challenges in online advertising are considered, mis-targeted ads, discriminatory ads, ad content issues, the opacity of financial flows and ad placement, ad fraud, and potential costs of platform switching are the key issues faced by consumers and businesses in the ad supply chain. Competition issues linked to the dominant positions of online platforms, and risks related to privacy are the key issues when the online advertising ecosystem is considered.

The mitigation strategies for addressing these issues include technology-based solutions that counter ad fraud and increased personalisation, behavioural changes in consumers to improve awareness of how online ads work, and processes for redressal of online advertising issues. In addition, a broad range of legislative and regulatory instruments have been introduced in the EU including the eCommerce Directive, the ePrivacy Directive, the Audio-Visual Media Services Directive, the Misleading and Comparative Advertising Directive, the Unfair Commercial Practices Directive, the Platform to Business Regulation, the General Data Protection Regulation, the EU anti-trust rules, and the forthcoming Digital Services Act and Digital Markets Act.

This paper considered this data on challenges and strategies in conjunction with two systematic reviews of online behavioural advertising to develop an initial specification for the framework. As part of this framework, three levels of market players are discerned: (i) consumers; (ii) businesses; and (iii) the online advertising market ecosystem. The challenges are categorised in terms of: (i) advertisement flows; (ii) resilience of ad supply chain and

participating market players; and (ii) ethics of online ads and competitiveness of the online advertisement market ecosystem. The mitigation strategies are classified in two broad areas: (i) technology-based and behavioural change-led strategies; and (ii) legislative and regulatory initiatives. The intended outcomes of any regulatory oversight are: (i) improved consumer information and protection; (ii) increased competition in the advertising market; (iii) improved market reach and effectiveness of online advertising; (iv) increased commercial returns of online advertising to advertisers, agencies, DSPs, and publishers, ad exchanges, ad networks, and SSPs; and (v) growth in the online advertising market turnover. Based on these elements, a draft schema to identify the areas of intervention as part of the framework for regulatory oversight has been presented. Although the findings used to assemble the framework are based on a literature review of the open online display market, the draft schema is intended to be extensible to other currently known paid-for forms of online advertising markets i.e. the search market, social display market, classified market, and sponsorship or influencer marketing.

The comparative aspects of the draft framework are based on current legislative and regulatory initiatives in the UK and the EU. The integrative aspects of the framework draw on technology-based and behavioural change-led strategies in conjunction with legislative and regulatory initiatives. However, an impact assessment of intended and unintended outcomes of the interventions is needed to ensure a more complete regulatory oversight of online advertising. To fully develop a framework specification which can cover all possible (existing and emerging) forms of online advertising, the challenges posed by the cross-border reach of online advertising, and different legislative, regulatory practices across various jurisdictions, a systematic review of the literature is needed. This requires a systematic review of practices in the UK and the EU in addition to the US, China, Japan, Australia, Singapore, or any countries which appear to have an active regulatory oversight agenda for online advertising. The initial specification of framework in this paper needs to be tested for efficacy in relation to specific interventions. Developing case studies of various technology-based and behavioural change-led strategies, and legislative and regulatory initiatives based on this framework could be an interesting avenue for further research. Further investigations of the various non-regulatory strategies and regulatory initiatives in practice, and their intended/unintended outcomes could prove useful in identifying possible extensions to the framework identified in this paper.

Beyond the logistics of developing, assembling, and testing the draft framework specification however, given the rapid pace of change in the online platform economy, a more data-driven mechanism for continually monitoring developments and responding to market challenges needs to be investigated and developed. Any extensions to the framework would be welcome to not only strengthen existing knowledge and understanding of the online advertising landscape but also assist various market players in their decision-making in the days ahead.

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