Digital Attention Intermediaries

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This article provides a guide to the world of digital attention intermediaries and concludes with a discussion of several policy issues with a focus on competition policy and consumer protection. It addresses the following questions: How do attention intermediaries operate in the real world? What are economic mechanisms that may contribute to understanding markets with digital attention intermediaries? Recent insights from the economics of platforms and media economics inform the replies to these questions.

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I. Introduction

Welcome to the world of attention intermediaries. As Jonah Weiner writes in *The New York Times Magazine*, "the dominant force driving TV in the Netflix age is the same one driving social networks, video-sharing platforms and online publishers: the relentless pursuit and monetization of our attention."[1] Viewers spend time on content in return for paying a subscription price or a price per view, being exposed to advertising, or their data being collected.[2]

The first two decades of the 21st century have seen the emergence of large international players on the internet that have affected the lives of billions of users. These include Alphabet/Google (owning Google Search, Google Maps, Android, and YouTube among others), Meta/Facebook (also owning WhatsApp and Instagram), Alibaba, Amazon, and ByteDance (owning TikTok). Although their business models differ, what they all have in common is that they use large volumes of data to channel the attention of consumers to services or products provided by others and sometimes provided in house. Google and Facebook monetize attention by selling advertising. According to Insider Intelligence, Google made worldwide ad revenues of US$ 168 billion; Facebook, US$ 113 billion; Alibaba, US$ 41 billion; Amazon, US$ 38 billion; and ByteDance, US$ 29 billion in 2022 (net of traffic acquisition costs to partner sites). As documented by Statista (with data from eMarketer), Google had a share of 28.4% of all digital ad revenues in the US; Facebook, 20.4%; and Amazon, 11.8%, and digital ad revenues accounted for 61% of total ad revenues in the US; television/video, 21.4%.[3]

[1] Quoted from Jonah Weiner, "The great race to ruling streaming TV", New York Times Magazine, July 20, 2019.

[2] For an empirical analysis of online viewing behavior using U.S. clickstream data in the period of 2008-2013, see Boik, Greenstein, and Prince (2016). In this period of changing offers, they find that viewing behaviour is persistent with respect to how they allocate their attention online: "Reallocation of online attention comes almost entirely in the form of changes in how households select from a portfolio of different web sites, but not in the form of changes in total time or breadth and depth." (Boik, Greenstein, and Prince, 2016, p. 4)

[3] See https://www.statista.com/statistics/242549/digital-ad-market-share-of-major-ad-selling-companies-in-the-us-by-revenue/ and https://www.statista.com/statistics/183704/us-advertising-spend-by-medium-in-2009/, last accessed 13 December 2023.

The role of data in making platforms thrive has been recognized. However, data collection and analytics is only one success factor, and literature on the role of data has been substantial recently. In this article, I focus on another (but related) success factor that has been key in media markets from the start: user attention. The role of consumer attention on Amazon, Google Search, YouTube, Facebook, and other platforms can be understood by looking into their business models.[4]

The original business model of Amazon was that of a digital retailer. It consisted in recommending products stored in Amazon warehouses to consumers based on their search queries and the data collected by Amazon on the respective and other consumers.[5] Arguably, recommendations shift consumer attention to products or services that are expected to be more profitable for Amazon – at least in the long term (that may also benefit consumers). With the launch of its marketplace, Amazon increased its set of offerings (in particular, the set of products) and could recommend products that it did not keep in stock (or stocked on behalf of others). It still uses consumer data to help consumers find products they might be interested in buying. When selling through Marketplace, instead of earning the retail margin, Amazon obtains revenues from charging listing and transaction fees. Amazon is an attention intermediary in the sense that it delivers and channels attention to sellers (and its own vertically integrated offerings) that consumers use typically actively (*i.e.*, users go to Amazon with a purchase intent). With its Amazon Prime offers, Amazon reaches out to consumers offering them to stream music and films. Thereby, Amazon also competes with other platforms offering music and video streaming services through subscriptions that are bundled with other Amazon services. Once on the Amazon website, a consumer is encouraged to stay and look for special deals. Recently, Amazon lists sponsored items prominently after a product search, moving its monetization model partly in the direction of an advertising-based model.

Alphabet provides the Google Search engine. This search engine

[4] See also Belleflamme and Peitz (2021, chapter 1).

[5] Amazon's management of the consumer side is one of the keys to understand the success of Amazon and is my focus in the context of attention markets. Another success factor is its investment in logistic capabilities (which partly also rely on data and their analysis, e.g., to predict how many units of a particular product to keep in stock), which is outside the focus of this article.

features two types of listings, one contains organic search links; the other, sponsored search links.[6] Organic search links are a service that is provided at zero price to the provider of the link as well as to the user entering the search query. By contrast, sponsored search links are auctioned off to interested parties at a high level of granularity, allowing for a highly targeted audience being reached by the provider of the link. The business model of the Google search engine can thus be described as a multi-sided platform that makes revenues from parties advertising on the sponsored search list. Google Search is an attention intermediary that consumers use actively (*i.e.*, users enter search requests to collect information, obtain entertainment, or purchase a product or service).

Before developing a monetization model, YouTube (now owned by Alphabet) was a two-sided platform with providers of user-generated content on one side and viewers of such content on the other.[7] Later YouTube added a third side for monetization purposes; that is, YouTube charged advertisers for embedding ads in a video and thus consuming some of the attention.[8]

Facebook is a social network that allows users to interact with other users to share experiences and opinions. Users do not make monetary payments for this service.[9] However, together with user-generated content, Facebook allows advertisers to reach consumers through multiple channels. Advertisers can choose narrowly targeted advertising that appears together with user-generated content. This targeting is possible thanks to the data Facebook collects about its users. Facebook is an attention intermediary that consumers visit for user-generated

[6] Recently, Google added information to certain search queries that it provides without the need to click on a particular link.

[7] Arguably, there was some overlap between the two sides, as people could upload self-produced videos and watch other videos as well.

[8] This is a very simplified version of the YouTube's business model as it is. YouTube pays content providers depending on the popularity of their content. Also, YouTube allows for sponsored videos. More recently, YouTube introduced an advertising-free subscription model (for videos and music).

[9] At the end of 2023, Meta announced that it is introducing an ad-free subscription-based model in the European Union and other selected countries, and consumers can choose the traditional "free" ad-funded version and the new subscription-based access. https://about.fb.com/news/2023/10/facebook-and-instagram-to-offer-subscription-for-no-ads-in-europe/, last accessed 20 December 2023.

content, and their attention is partly diverted to advertisers. Advertisers may also attract the attention of consumers if they become followers of a particular brand or seller. In this case, consumers take an active role in soliciting advertising and offering advertisers the opportunity for consumers to interact with the brand. Instagram follows a similar business model; how big advertising will figure on WhatsApp is unclear.[10]

A sizable part of revenues obtained by Google and Meta is through advertising, and both leave a large footprint in digital advertising markets, as documented above.[11] This evidence confirms the growing importance of digital attention intermediaries for sellers to reach consumers. Amazon obtains revenues by taking a cut from the sellers who sell via its Marketplace, and recently has moved into advertising. Arguably, with regard to attention intermediaries, YouTube and Facebook come to mind and perhaps Google Search and Amazon less so. In the case of the former two, time on the platform is an important metric, but this importance is open for discussion in the latter two.

I define *an attention intermediary* to be *a multi-sided platform that attracts the attention of "viewers" and allocates their attention to one or several groups of attention seekers such as content providers or advertisers*. I focus on attention intermediaries that do not monetize on the viewer side but on the side of attention seekers. They are attractive to attention seekers because of the volume of attention they can offer, possibly exclusive access to some viewers and targeting of access to viewers with certain characteristics. Regarding the latter, intermediaries' ability to monetize may well depend on data collection and analytics

[10] Meta announced that ads will appear on WhatsApp starting 2020. See, e.g., Anthony Cuthbertson, "Whatsapp: Adverts coming to messaging app next year, Facebook reveals," The Independent, May 28, 2019, https://www.independent.co.uk/life-style/gadgets-and-tech/news/whatsapp-adverts-update-new-advertising-when-a8933131.html but as of 2023 advertising does not feature on WhatsApp. However, WhatsApp plays an indirect role in the ad-related ecosystem of Meta because businesses can place ads on Facebook and Instagram that directly link to WhatsApp.

[11] See, e.g., ACCC (2019). For a discussion of the functioning of digital advertising markets and a guide to the marketing literature about inefficiencies due to problems of measuring ad effectiveness and ad fraud on the advertiser side, ad blocking on the consumer side, conflicting interests among players in the value chain of advertising markets, see Gordon et al. (2020).

(*e.g.*, targeted advertising). As this overview article focuses on the role of attention, I mostly abstract from the role of data for monetization.

This article provides an economist's guide to ad-funded attention intermediaries with a focus on the advertiser–consumer interaction. I try to cover a variety of aspects, but an encompassing literature review on the topic is beyond the scope of this guide. In section 2, I describe the role that a few leading attention intermediaries play in the real world. In Section 3, I point to economic theory contributions for a better understanding of certain aspects of attention intermediaries. In Section 4, I address a few policy issues in the context of attention intermediaries.

II. Role and functioning of digital attention intermediaries in the real world

The rise of mass media can be seen as the rise of large attention intermediaries. To the extent that these mass media rely largely on advertising revenues, their revenue model resembles that of Facebook, as they bundle content together with advertising. Mass media attract users mainly through content and divert part of their attention to advertisers.[12] Put differently by Newman (2020, p. 12), "humans produce attention and trade it to a downstream counterparty in exchange for some desired product or service like news, music, television programming, access to an online social network, or Internet search

[12] Whether consumers like or dislike advertising is context-specific. For instance, there is empirical evidence that readers of fashion magazines seem to enjoy the ads and people are looking forward to seeing the ads during the Super Bowl, while on average consumers dislike advertising on television, radio, as well as audio and video streaming platforms. With advertising becoming more targeted, on the one hand users may see advertising less of a nuisance because it is targeted towards their interests. On the other hand, at least some users may see advertising more intrusive disrespecting their private sphere and for this reason dislike it more. In the end, it is an empirical question to be raised in each context whether consumers tend to like or dislike the exposure to advertising or sellers. A platform has multiple ways to affect this channel and thus the assessment may well be platform-specific and not just depend on the format in which content and advertising are presented. If consumers like advertising, there is a positive feedback channel between consumers and advertisers. If they dislike advertising, there is a negative feedback channel and thus a negative indirect network effect.

results." Even shopping malls can be seen as attention intermediaries, as they lure potential shoppers partly as a safe, well-temperatured place to stroll around and partly because of the offers made by sellers, which constitute the other side of the platform. The sellers pay the shopping mall because it delivers the attention of potential shoppers, and the more time the potential shoppers spend in the mall, the more attention sellers receive overall.[13]

The success of Alphabet, Meta, and Amazon (among others) can be attributed to their ability to scale up their operations to satisfy many needs of many consumers. This scale allows them to spread investment cost over many consumers, deliver attention at a very granular level that is appealing to sellers or advertisers,[14] and create less nuisance or even benefits to consumers. They can thus be seen as master attention intermediaries. Other attention intermediaries make specific offerings, which absorb a large fraction of time of a group of attention providers. They include travel intermediaries such as Booking and Expedia; entertainment intermediaries such as Netflix (audio-visual content), Spotify (audio content), and League of Legends (a particular gaming site); and dating sites such as Tinder and Bumble.

Attention intermediaries make decisions regarding the degree of vertical integration of content and their monetization model. Many digital intermediaries, big and small, operate as attention providers for parties wanting to sell a product or service and users interested in products or services provided by the digital intermediary or other parties. Apple provides its own ecosystem in which it offers music and video. Apple and Amazon have started to be partially vertically integrated by producing their own content. Similarly, Netflix started as

[13] This view contrasts with Wu (2019) who claims that there is an important difference between attention merchants and two-sided platforms such as shopping malls. One may argue that the former provide bundles of content and advertising, whereas consumers go to a shopping mall simply to be exposed to the offers by different shops. However, shopping malls have also created "content": people come to see the end of season decoration, listen to some life music, etc. In any case, all these intermediaries "sell" some of the consumers' time or attention to advertisers or sellers.

[14] This allows advertisers to address consumers with specific characteristics selectively and arguably reduces entry costs for new products with a narrow target group. Furthermore, it opens the possibility for advertisers to experiment so that they better learn about the effectiveness of advertising.

an intermediary between content providers and viewers and moved into own content production. Regarding their entertainment offers, these three did not follow an ad-financed business model and instead relied on subscription fees (they also possibly monetize data they collect from consumers). However, the stance taken on the preferred monetization model may shift over time, along with the relative importance of advertising revenues.[15] For example, Netflix initially offered only an ad-free subscription service, but introduced an ad-supported plan at a lower subscription fee in November 2022.[16] Spotify has a subscription service (*i.e.*, consumers pay a monthly subscription fee) and a "free" ad-financed service among which consumers can choose. YouTube used to offer only a "free" ad-financed service, but it has recently introduced an ad-free subscription service. Traditional media players who used to offer linear programming enter the streaming world. Disney has launched its fully vertically integrated and ad-free streaming service Disney+. Initially it had neither advertisers nor independent content providers on board and thus did not run a multi-sided platform. However, the functioning of its recommendation algorithm relies on being fed with plenty of user data. From the beginning, Disney+ strongly relies on a sufficiently large network of users, which sets it apart from the traditional linear programming on television. At the end of 2022, Disney+, like Netflix, introduced a lower-priced ad-supported subscription plan. Other traditional media giants have their own offers (HBO Now, Showtime, CBS All Access in the US). All these players, old and new, vie for the attention of consumers.

The fight for consumers' limited attention has a long history. Newspapers appeared in Europe in the 16th century. They noticed that by including advertising, they could make revenues and keep the price

[15] Ad-financed versus subscription-based (or possibly a combination of the two) monetization models by digital players correspond to the different monetization models used in traditional media. See also the discussion in Section 1.

[16] In March 2022, Netflix CFO Spencer Neumann claimed not to think of introducing ads on Netflix: "Again, never say never, but it's not in our plans. Other folks are learning from it so it's hard for us ignore that others are doing it. But for now, it doesn't make sense for us." Quote reported in Bevin Fletcher, "Netflix, Disney+ jump into ad-supported streaming in 2022," 29 December 2022, StreamTV Insider, https://www.streamtvinsider.com/advertising/netflix-disney-jump-ad-supported-streaming-2022

per copy charged to readers low. Complaints about advertising appeared early.

> "Advertisements are now so numerous that they are very negligently perused, and it is therefore become necessary to gain attention by magnificence of promises, and by eloquence sometimes sublime and sometimes pathetic." (Samuel Johnson, in The Idler, issue 40, January 20, 1759)

Attention intermediaries steer consumers to certain offers partly driven by the consumers' desires and partly by the intermediaries' monetization incentives. Even a marketplace that allows sellers to temporarily set up shop or a trade fair that allows exhibitors to showcase their products can be seen as attention intermediaries to a certain extent. Being hidden in a dark corner instead of close to the entrance may make a seller struggle to reach the attention of consumers. Thus, what may be perceived to be an unfavorable listing on a portal corresponds to the dark corner in a trade fair. Branded manufacturers' products occupy shelve space, and some parts of the shelf attract more attention than others. Marketing practitioners have assessed the value of products being placed in a particular part of the shelf relative to another. Particular locations in a shop receive much attention (*e.g.*, shelves close to the checkout). Shop managers experiment with how to allocate shelf space and ask brand manufacturers to pay for preferential treatment. This practice resembles, for instance, sponsored listings by hotels on Expedia that appear at the top of a search.

What is new in the digital world is that few attention intermediaries are prominent for a large range of activities. Some of them are the natural starting point of many online activities and feature frequent engagement (*e.g.*, Apple, Google Search, or Amazon), whereas others provide platforms on which consumers spend a lot of time (*e.g.*, Facebook/Instagram, TikTok, or YouTube). This prominent role can be measured by the amount of time consumers stay, the number of daily visits or clicks on the site, and, less closely related, by the market valuation of the companies behind these offers.

III. Markets for attention and their masters

A. Value creation and value capture around attention

Attention intermediaries provide "content" to users. This content is produced in house, by third parties, or a mix of the two. These third parties may be for-profit content providers or individuals who do so for non-monetary incentives.[17] The attention intermediary who bundles content with advertising has to decide whether and how to compensate third-party content providers. It also decides whether and how to charge viewers (*e.g.*, pay-per-view and subscription prices); furthermore, it decides about the advertising rate charged to advertisers or the number of ad slots that are auctioned off.[18] Although consumers often do not make any monetary payment to these intermediaries, consumer attention is essential for the intermediary to obtain revenues. The intermediary may forego revenues shortly after the launch to increase its user base but eventually it has to monetize through other means. Thus, a market in which services provided by the intermediary (by the intermediary itself or third parties on the intermediary's platform) are exchanged for consumer attention exists.

a) Monetizing attention

Intermediaries may monetize this attention not directly in their interaction with consumers but by providing listing services to sellers of content for which they charge in form of listing or transaction fees (*e.g.*, by charging a listing, per unit or ad valorem fee) or by charging advertisers (*e.g.*, by charging a pay-per-impression or a pay-per-click fee). Attention may also be valuable to the intermediary because of the data this generates.[19]

[17] There is no sharp dividing line. Take content provision on YouTube. Some Youtubers started by uploading videos for fun and only later became professionals. Others do not intend to make a living from it but provide niche content to earn some pocket money.

[18] Wu (2019) claims that an additional pricing decision by the attention intermediary is to determine the "attentional price", that is, how much advertising to combine with content. However, this is not a separate decision, but the "attentional price" is pinned down by the attention intermediary's decision on the type and volume of advertising.

[19] These data may be of value to a platform for a number of reasons: (i) the

When launching a platform, intermediaries may not even know which revenue model to follow. They may also collect data and eventually use them to provide other services to consumers, sellers, or other parties.[20] Different revenue models may coexist in an industry. In some cases, intermediaries allow users to pick the channel through which revenues are generated. As mentioned above, Amazon offers premium and additional services to subscribers through Amazon Prime, thus directly charging Amazon Prime customers. YouTube offers subscription for advertising-free video streaming as an alternative to the "free" advertising-financed offer. Such contract offers can be used by the attention intermediary to discriminate between those consumers who are very averse to advertising and others who are less so.[21]

No matter what the revenue model, these businesses feature network effects. They may be direct on the consumer side (*e.g.*, users care about the fraction of friends subscribed to a social network) or indirect arising from mutual positive cross-group network effects between consumers and sellers.[22] An example of the latter is the success of Amazon Marketplace, which is partly due to the fact that Amazon designed its platform with the key feature that sellers are attracted by a larger

platform may be able to make a more attractive service proposal to consumers, which reduces the competitive pressure faced by the platform and, everything else given, leads to more usage; (ii) the platform may be better able extract more surplus from consumers (possibly without them noticing); (iii) the platform may be able to make a more attractive service proposal to advertisers (possibly to the detriment of consumers) and platforms will participate in the associated higher earnings of advertisers; (iv) the platform may make more attractive offers for otherwise unrelated services to consumers; (v) the platform may sell the data to third parties which derive value from them (possibly to the detriment of consumers).

[20] Data may also be used to reduce costs and then become source of economies of scope. For example, Amazon's stocking decisions for its warehouses depend on user data. Consumers may also benefit from this because in addition to reducing excessive stocks, shortages become less frequent leading to shorter delivery times. At a more granular level, Amazon can even put some fast-moving items into its delivery vans before these items are ordered and, thus, allow for even faster delivery.

[21] For a formal theoretical investigation, see Zennyo (2020).

[22] For an overview of how intermediaries manage network effects on their platform, see Belleflamme and Peitz (2018b). Relatedly, if sellers compete with each other, intermediaries may also manage the degree of competition on their platform, see Belleflamme and Peitz (2019).

number of consumers and consumers attracted by a larger number of sellers. The latter is not obvious and relies on Amazon being able to guide consumers to sellers that are likely to lead to a successful match. Positive cross-group external effects here arise through the platform design decisions about how informative its recommendations and ratings systems are.[23]

Attention intermediaries are part of a longer value chain. Value creation here often features multiple complements comprising of services, products, and infrastructure. For example, using Google Maps to find your way in the city requires a mobile device (*e.g.*, smart phone) and a functioning internet connection (*e.g.*, via 4G or Wi-Fi). The value that is created is thus jointly created by the availability of infrastructure, products, and software solutions. Such complementarities imply that value creation cannot be meaningfully allocated to a particular layer in the value chain.[24] Concerning the value created by a particular attention intermediary, one often fails to acknowledge its dependence on devices and infrastructure.

Value capture is the ability of a firm to extract part of the value it helped create and then depend on the ability of actors in other layers of the value chain to extract value. For instance, if one layer is heavily regulated and prohibited from using certain price instruments, this circumstance may benefit firms in another layer.[25] Having said this, the remainder of this article abstracts from these complementarities by taking products and infrastructure as given.

b) Time use and addiction

Some digital offers are thought to be highly addictive. For instance, internet gaming addiction and internet gaming disorder have been identified in several studies (for summaries, see Petry *et al.* 2014; Darvesh *et al.* 2020). The use of social media and streaming platforms

[23] For an overview on the functioning and design of recommender and rating systems, see Edelman (2017), Belleflamme and Peitz (2018a and 2021, chapter 2).

[24] For a detailed exposition in the context of OTT, see Peitz and Valletti (2015).

[25] One particular example is net neutrality regulation that limits the ability of internet service providers to price traffic. Net neutrality regulation then has an impact on the revenues generated by attention intermediaries such as YouTube. An economists' introduction to the net neutrality debate is provided by Greenstein, Peitz, and Valletti (2016).

may also be associated with addiction. Allcott *et al.* (2020) find that social media consumption may be excessive from a consumer welfare perspective.

Addiction may simply mean that higher consumption today positively affects individual demand tomorrow; thus, a consumer may develop a habit for it. If consumers rationally foresee such intertemporal demand links, then the addiction is rational (Becker and Murphy 1988). The consumer is under full control of their intertemporal demand. If the addiction is seen as something harmful, the consumer can reduce their exposure to the experience that triggers the addiction. For example, a consumer worried about addiction from internet gaming may stay away from games considered highly addictive. This situation then incentivizes the firm offering the game to reduce the addictiveness, as it faces a tradeoff between the time spent by an enrolled consumer and enrolment rate.

However, consumers may have biased information (*e.g.*, they underestimate the addictiveness) or be subject to self-control problems. In these cases, they make decisions that they later regret. In a randomized field experiment run in 2020, Allcott, Gentzkow, and Song (2022) analyze smartphone use for Facebook, Instagram, Twitter, Snapchat, YouTube and web browsers. They find that users are partially (but not fully) aware of their self-control problems and, thus, willing to opt for commitment devices that limit internet use (see also Hoong 2021). Estimating a consumer model of addiction, they attribute around 30 percent of social media use to the users' self-control problems.

B. Some simple economics of attention markets

Attention markets have certain features that deserve attention by policy makers. This subsection contains three lessons of attention markets that relate to how competition on these markets plays out. First, attention intermediaries compete for the time consumers spend on their platforms. If intermediaries monetize through advertising that consumers regard a nuisance, the presence of a larger number of attention intermediaries benefits consumers, as attention intermediaries tend to reduce advertising volumes and improve content offers. Second, when a consumer's attention span is limited, attention becomes a scarce resource. Society may be better served if not multiple, but a

single attention intermediary takes care of this resource, contradicting the first property that holds with an unlimited attention span. Third, with multiple attention intermediaries, depriving competitors of the consumer's attention may be excessively costly for a seller. A higher concentration among attention intermediaries tends to be bad for consumers as they have to choose from a narrower set of products and have to pay higher prices. The underlying economics of these lessons are explained next. Fourth, I elaborate on attention intermediaries playing the role of recommenders.

a) Competing for attention

Attention intermediaries deliver content or experiences to consumers. This may include in-house content, content purchased by the intermediary (*e.g.*, articles or videos posted on ad-financed media portals), "free" content that is collected by the intermediary (*e.g.*, organic search results), user generated material uploaded by the users (*e.g.*, user generated videos on YouTube or uploaded photos and short videos on Instagram or Facebook), and material by advertisers who pay to the attention intermediary for dissemination. Ad-financed attention intermediaries that provide bundles of content and advertising can make a better value proposition to consumers along several dimensions. These dimensions include (i) reducing the amount of advertising if consumers prefer content, (ii) making the time dedicated to advertising more pleasant, (iii) increasing the expected benefit from the interaction between advertiser or content provider on one side and consumer on the other side, and (iv) increasing the quality of the content or services bundled with advertising.

Whether or not consumers like advertising, may depend on the platform design decisions by the attention intermediary. For example, a brand may attract a group of followers on a social network, and these consumers may consider being exposed to videos or information on special sales a positive experience. This relates to dimension (ii): if the attention intermediary makes advertising less intrusive, users' attitude towards advertising changes. As an example of dimension (iii), if attention intermediaries increase the transparency of content providers' offers and, as a result, allow consumers to obtain a better experience, they are better off accessing the attention intermediary instead of

connecting directly with content providers.[26] Regarding dimension (iv), consumers appreciate the overall bundle if the content part is of higher quality. The attention intermediary's incentives to provide such quality depend on its monetization possibilities. Limiting the intermediary's ability to raise revenues from advertising through regulatory intervention may backfire, leading to lower quality of the overall bundle and thus to a lower consumer welfare.[27]

Consumers searching for content may benefit from variety on the platform. If the matching service works to the benefit of consumers and is provided free of charge to consumers, they are not paying directly. In an ideal world, consumers have to pay scant attention to the different offers because the attention intermediary finds the best match from a consumer perspective. By contrast, if consumers are interested in paying attention to certain content, which is then interrupted by ads or other inferior offers, consumers do pay with their attention. A simple measure of this cost to consumers is the time advertising takes. However, this metric may be too simple. For example, it may depend on the sequencing of ads, which has an impact on how disruptive advertising is.

To summarize, platforms may charge content providers and sellers for hosting them or initiating or terminating interaction with consumers.[28] Although consumers do not make a monetary payment to the attention intermediary, they may pay indirectly because of their opportunity cost of time. They may also pay in the product market if sellers pass some or all the fees paid to the attention intermediary on to consumers.

In general, the typical revenue model of attention intermediaries is to charge those users who want to attract the attention of another group of users and have their own way of monetizing this attention. If an attention intermediary is ad financed, its revenues increase along with

[26] For instance, news aggregators provide access to different sources of news, which in turn affects the news providers incentives to invest in high-quality news. For a formal investigation, see Jeon and Nasr (2016).

[27] Evans (2019) stresses the link between advertising and content provision. However, if a change in the market structure leads to a drop in ad revenues this does not imply that content quality must suffer.

[28] Intermediaries have multiple price instruments at their disposal. They can charge sellers for listing, charge a per-click or per-transaction fee, or ask for a revenue share for transactions terminated on their platform.

the number of consumers and amount of time consumers spend on its platform. If consumers make a discrete choice among different attention intermediaries (*e.g.*, consumers watch one news show and decide which one to watch), attention is exclusive. In this case, all the attention is channeled through one attention intermediary, and intermediaries compete for the available number of consumers present. With non-exclusive attention, consumers spend some amount of time with an attention intermediary. If consumers are rather similar, attention intermediaries compete for the time each consumer spends on their platforms.

Advertisers can and often do advertise on multiple attention intermediaries. If consumers on different intermediaries generate the same value to advertisers, then advertisers wanting to advertise on one platform also tend to be interested in advertising on another platform. In other words, advertisers tend to multihome. By contrast, consumers may singlehome in some environments and, at least some of them, multihome in other environments.[29]

The economics literature on advertising-financed attention intermediaries started by exploring the former environments when advertising is a nuisance.[30] Here, consumers consume a bundle of content and advertising (*e.g.*, on Facebook or YouTube). To increase the number of consumers on a platform, the attention intermediary has to offer an attractive bundle. It can do so by increasing the quality of the different parts in the bundle or reducing the amount of advertising relative to other more attractive content. Focusing on the latter, if an attention intermediary competes harder to attract more consumers, it must decrease the advertising volume. More intense competition among attention intermediaries then results in lower ad volumes and higher ad prices, which is desirable from the consumer perspective but undesirable from the advertiser perspective.[31]

Examples of environments in which consumers singlehome while

[29] A large part of the economics literature on two-sided platforms has looked at market environments in which one side singlehomes and the other multihomes. Here, platforms compete for users on singlehoming side and operate as monopolists on the multihoming side; this has been termed a "competitive bottleneck" (see Armstrong 2006).

[30] The seminal paper is Anderson and Coate (2005).

[31] For a formal investigation, see Anderson and Peitz (2020).

the other side (sellers and app developers) mostly multihomes are smartphones and personal digital assistants (PDA). A consumer decides whether to buy an iPhone and rely on Apple's system or buy a smartphone running on Android. In the consumer market for PDAs (and associated smart home devices), a consumer has the choice between Amazon's Alexa, Apple's Siri, Google Assistant, and Microsoft's Cortana among others. Although the smart phone may be a person's key device outside the home, the PDA (the software platform together with home devices and possibly in interaction with the smartphone) may become a key attention intermediary in the home. When walking in the streets of Manhattan, people are likely to rely on a single mapping service such as Google Maps; similarly, at home they are unlikely to simultaneously use multiple PDAs. Although they may change the mapping service from one day to another, they are unlikely to do so in the case of a PDA. Thus, PDAs feature singlehoming and consumer lock-in.

Attention intermediaries are in a particularly strong position if they give exclusive access to attention providers. In this case, the attention intermediary becomes a gatekeeper from the viewpoint of the attention seeker. Whether attention providers necessarily benefit needs clarification. Taking PDAs as example, people may get accustomed to using a PDA and rely less on alternative channels to obtain relevant information.[32] Even if competition in the market for installing PDAs in people's homes is intense, if PDAs cannot credibly commit to act in people's best interest, recommendation biases and inflated prices for services available on PDAs may become common because of the PDA's market power that materializes after people have adopted a particular PDA. In a world where an important fraction of consumption decisions is made via PDAs, prices may be inflated. Even consumers who try to bypass the PDAs may not find much better offers because sellers have little thought and resources to spend on those consumers. A contrasting, more favorable view about PDAs is that they provide a comfortable and curated environment in which consumers can choose

[32] As Ezrachi and Stucke (2016, p. 194) write, "… the more we communicate only with our personal assistant, the less likely we will independently search the web, use price-comparison websites, seek independent customer reviews, and rely on other tools. The ease of voice activation and verbal communication with our butler may limit our view of the available outside options."

which among competing apps provides the best services.[33]

PDAs may become the central interface for sellers to reach buyers. Given people's impatience regarding oral communications, they may make less-informed choices and be more open to accept biased recommendations. They may even fully delegate certain types of choices and trust their PDA to do the right thing for them, as rich people did in the past when they entrusted personal butlers to make choices for them.[34]

Many market environments feature heterogeneous consumers. Some consumers tend to consume the services of a single attention intermediary, while others use services from multiple such intermediaries. For example, some people used to be primarily active on either Facebook or Twitter/X, while others were active on both. An attention seeker can reach the multihoming consumers through multiple channels. An ad placed with one attention intermediary becomes a substitute for the ad placed with another. An advertiser is then willing to pay only the incremental value of posting another ad. The more consumers multihome, the less attention seekers are willing to pay for advertising.[35]

An attention seeker (*i.e.*, an advertiser) who purchases impressions on both platforms tends to focus on the single-homing attention providers. As these single-homing attention providers are the main source of revenues for the intermediary, it has a stronger incentive to cater to the tastes of these single homers. Consequently, its decisions regarding which content to provide may be tilted in favor of these consumers.[36]

b) Attention as a scarce resource

The success of Alphabet, Meta, and Amazon and other attention intermediaries is directly linked to the users' *limited attention*. Attention is limited by the amount of time spent with attention intermediaries and the inclination to actually pay attention to the messages that are sent.

[33] Similar issues may arise outside the home; for instance, if consumers obtain recommendations while driving.

[34] See e.g. Ezrachi and Stucke (2016, p. 193).

[35] For formal investigations along these lines, see Ambrus, Calvano, and Reisinger (2016) and Anderson, Foros, and Kind (2018). For an overview, see Peitz and Reisinger (2015).

[36] See Anderson, Foros, and Kind (2018).

First, by nature, the amount of available time of a consumer is limited. An attention intermediary who monetizes a consumer's attention then benefits from a user spending more time and attention on its platform.[37] Second, not all stimuli a consumer receives are valuable to the sender. Specifically, if an attention intermediary obtains revenues by selling advertising to sellers, they (if they act rationally) compare the cost of posting an ad to its expected benefit which goes down if some consumers do not pay attention to its ad or do not react after seeing the ad because they do not process all ads.[38]

Limited attention is not specific to the 21st century. As Herb Simon famously states,

> "[i]n an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it." (Simon 1971, pp. 40–41).

The intermediary's decision about what to show to consumers depends on their attention span, which is often limited. In some market environments, the advertiser has to contract with one specific attention intermediary to reach a particular consumer, that is, this intermediary is the only intermediary offering the possibility to reach the consumer.

Consumer attention is particularly limited when consumers are exposed not to written but to oral offers. While a consumer may pay attention to several offers when going through a written list of recommendation, the same consumer is likely to pay attention to fewer offers of a product or service when listening to recommendations. This suggests that in the world of personal digital assistants such as Amazon's Alexa, Apple's Siri, or Microsoft's Cortana, the set of sellers

[37] My definition of attention intermediary is one of focus rather than as being part of a classification of different intermediaries.

[38] There is strong evidence that even large sellers overestimate the effectiveness of advertising at the margin in the sense that they advertise excessively from a profit-maximizing perspective. See Shapiro, Hitsch and Tuchman (2021) for evidence and several possible explanations.

who can come to the attention of consumers is more limited than in the case of reading search results on the internet.[39]

To fix ideas, suppose a single attention intermediary exists and that advertisers do not have other means to reach the consumer. The monopoly attention intermediary then has a clear incentive not to overexploit the stock of the consumer's limited attention.[40]

If multiple attention intermediaries have access to a consumer's attention, overexploitation may occur in the sense that the number of offers exceeds a consumer's attention span. The consumer's limited attention is a common property resource from the intermediary's perspective. If seller and consumer interests are aligned, competition among attention intermediaries leads to lower platform profits, consumer surplus and total surplus. The view that consumers have a limited attention span then challenges the perspective that increasing the number of intermediaries is beneficial for society. Advertising volumes may actually increase, which clearly harms consumers, and this effect may outweigh the benefits from an increased variety of intermediation offers.[41] By contrast, if seller and consumer interests are misaligned, competition may increase consumer surplus and total surplus.

c) Attention intermediaries with competing advertisers

Market power of attention intermediaries is also of concern under consumer multihoming if competition exists between advertisers when acting as sellers in the product market. With consumers multihoming, sellers receive the attention if they appear on one of the platforms. A firm that posts on all platforms and keeps competitors out can raise its profits. This scenario is in the intermediaries' interest if they monetize

[39] The move from laptops to smart phone arguably led to more-limited consumer attention, as fewer offers can be seen on the screen of a smart phone compared to a laptop.

[40] This presupposes that if too much content reaches the consumer, some valuable content gets lost, whereas some less valuable content reaches the consumer's attention. This is clearly unattractive from the platform's perspective. For a formal investigation, see Anderson and de Palma (2012) and for a textbook treatment, Belleflamme and Peitz (2015). A particular specification how to think about the attention intermediary's rationale is provided in the subsequent two examples.

[41] For a formal investigation, see Anderson and Peitz (2023).

on the advertiser side and industry profits decrease as more firms compete. Taking consumer decisions and the number of platforms as given, markets with all platforms under a single owner perform differently from markets in which each platform is operated by an independent intermediary. With a single owner, the strongest firm pays for the attention of consumers on all platforms, and weaker firms are foreclosed. By contrast, with independently operating intermediaries, all firms become visible to consumers, and prices set by firms to consumers are low.[42]

Therefore, a merger between platforms (which coordinate their selling of attention) is profitable because it reduces product market competition. The ensuing higher seller profits are partly extracted by the intermediary who runs the platforms. The merger decreases consumer surplus and total surplus as it preserves the monopoly position of one of the sellers.

A different reading is that, for a given number of attention intermediaries, if a growing number of consumers dedicate their time to only one of the attention intermediaries for some type of activity (*e.g.*, maps when navigating through town or a PDA when shopping from home), it becomes less costly for established advertisers to deny competitors' access to consumers' attention.

d) Attention intermediaries as recommenders

Attention intermediaries channel the attention of consumers. In a competitive setting, attention intermediaries compete with bundles of content offers and in the way they present their content offers to consumers. Traditionally, newspapers had to decide about the top story on the front page. Editors tried to find the most important story, and the importance is often defined by how much attention the story attracts at the newsstand so as to make consumers buy the whole paper.

Traditional media use a one-size-fits-all recommendation system (it makes prominent certain stories, less prominent others, and disregards yet others) that is often based on decisions by humans regarding what is more relevant. By contrast, many digital players have

[42] The argument is due to Prat and Valletti (2022) who provide a formal analysis.

delegated recommendations to algorithms that provide personalized recommendations. To provide useful personalized recommendations, a platform needs to make predictions on what a particular consumer is likely to enjoy. To do so, it relies on data collected from this consumer and data from other consumers. This suggests that digital players need sufficiently rich data to make successful recommendations and may imply that they need to reach a critical mass of consumer engagement to be viable in the long run.[43] The recommender system gives rise to network effects. The better the recommendations, the more attention consumers dedicate to the offers available from the digital player. As Jonah Weiner writes in *The New York Times Magazine*,

> "[…] it's imperative for platforms that when we dig through their digital heaps we find something great, or at least great-ish, often enough that we don't go digging elsewhere. This is where recommendation algorithms come in. Unlike an old-school broadcaster, a digital platform generates oceans of second-to-second data about viewing habits, sign-ups and subscription loss. Platforms use this data to group customers into different segments, organized around viewing preferences — and if all is working as it should to recommend shows that match those preferences."[44]

As digital platforms compete for consumers' attention, they have an incentive to provide good recommendations. However, digital players may have other concerns when providing recommendations. For example, an attention intermediary with partially vertically integrated content may want to bias its recommendation toward its own offers because it does not have to pay for streaming its own content (whereas it has to pay for third-party content).[45] What is more, if some third-party providers receive more than others, the attention intermediary is tempted to recommend the less costly content.[46] Hence, attention

[43] If some blockbuster productions are critical for the success with consumers or if consumers obtain useful recommendations from elsewhere, the quality of the recommendation system by a digital player is less of an issue.

[44] Quoted from Jonah Weiner, "The great race to ruling streaming TV", New York Times Magazine, July 20, 2019.

[45] For a survey on self-preferencing, see Kittaka, Sato, and Zennyo (2023).

[46] According to Aguiar, Waldfogel, and Waldfogel (2021), Spotify biases

intermediaries may somewhat bias their recommendations.[47]

IV. Policy issues with attention intermediaries

Attention intermediaries sell consumer attention to advertisers. Does a single market for attention exist in which different intermediaries compete with one another for the scarce attention of consumers? Separate markets for television, video streaming, gaming, and social network use may be present. However, decisive for market definition is the substitutability between these different uses of a consumer's time. For instance, Malone *et al.* (2023) find substantial substitution between television and video streaming. Moreover, large attention intermediaries such as Google and Facebook aim at keeping consumers within their ecosystem, making a variety of content offers. Google and Facebook may be active in a rather broadly defined attention market.[48]

The possibility of tailoring digital advertising points to the possibility that several separate advertising markets exist wherein different sets of advertisers are active depending on the type of offerings made by the platform (*e.g.*, Bundeskartellamt 2023, pp. 6-12). Attention intermediaries can then monetize the aggregate consumer attention in separate advertising markets depending on the way advertising is sold and presented and on the information regarding a consumer's characteristics and behavior.

Attention intermediaries may possess market power for several reasons. First, they may deliver superior or differentiated services to its users and, therefore, be in a stronger position than their competitors. Superior services may stem from investments by the intermediary, *e.g.*, in a better-functioning or more-user-friendly web portal or superior content. Product improvements and differentiation are typically an ongoing process. For example, YouTube adds new content at a high frequency, updates its recommendations, and has moved into new

recommendations against major labels. One may speculate that this is Spotify's response to the fact that major labels ask for higher royalties.

[47] See also Belleflamme and Peitz (2018a; 2021).

[48] This does not imply that there is only one antitrust market for attention, broadly defined – market definition will be case-dependent. What is more, an important fraction of consumers may have much very limited substitution patterns. See the discussion of single v. multihoming consumers in Section 3.2.

content categories over time.

Second, attention intermediaries sometimes pick up ideas and features developed by others;[49] they learn from competitors what works better or is popular with users and adjust. Again, this approach is not different from how other firms operate. For example, Facebook imitated some features from Snapchat. This move can be seen as a strategy to reduce product differentiation. As long as there exists product differentiation in other dimensions, this can emerge as the equilibrium strategy even absent any dynamic considerations.[50] Attention intermediaries can try to compensate a disadvantage, create an advantage, or achieve product differentiation through their own investment, exclusive contracts or vertical mergers. For example, Netflix invests in own content, but also buys exclusive distribution rights and occasionally buys media firms (*e.g.*, it bought Storybots, a children's media company, in 2019).

Third, attention intermediaries may have successfully locked-in some users; they do so if consumers are subject to consumer switching costs (see Klemperer, 1995). Consumer lock-in is of particular relevance if consumers are myopic. In this case, consumers may not foresee that an established platform may use attention and data not only to provide superior content proposals but also to generate revenues on the advertiser side, which may negatively affect their experience on the platform or their interaction with advertisers. Consumers may be locked-in because a competing platform may take time to collect data on them to be able to provide the right services. In addition, lock-in also arises if consumers only infrequently revisit the decision to spend some time with the attention intermediary. Then, a consumer who considers switching to a newcomer knows that this newcomer will remain small for some time. This circumstance then leads to excess inertia because it is better to wait until another consumer spends sufficient time with the new attention intermediary. Lock-in is also possible on the advertiser side. For example, an advertiser benefits more from the advertising service of one platform compared with another if they have been more active on the former.

In emerging industries, competing attention intermediaries may

[49] They may do so either by imitating a feature introduced by another firm, or simply by taking over that firm.

[50] It may even hold if product differentiation is horizontal; see Irmen and Thisse (1998).

have an interest to ensure low switching costs, *e.g.*, by agreeing to joint standards. Consumer switching from one intermediary to another is facilitated, so consumers may become more interested in accepting one of the competing offers (they are less afraid to become locked-in). This may explain the recent initiative by Alphabet, Amazon, and Apple among others to develop a joint standard for the smart home.[51] Since Alexa, Amazon home, and Siri allow users to control physical devices, not only consumers but also appliance makers are affected. In particular, with one common and open standard in place, appliance makers more easily benefit from scale economies. Consumers then may benefit not only from the ability to continue to use their appliances after switching *e.g.*, from Alexa to Siri. In addition, they may also benefit from lower prices for appliances. Attention intermediaries' incentives may however be different in more mature markets because "exploiting" consumers who are already hooked up may become more attractive.[52]

Fourth, in attention markets, consumers tend to make decisions quickly relying on heuristics and being possibly manipulated by the way offers are presented; that is, consumers are often subject to behavioral biases. One example is that consumers agree to reveal their personal data without much thought to move quickly on to the content they are asking for. They look for instant gratification, but ignore long-term costs (which, in addition, are subject to uncertainty). Another example is that consumers may follow the recommendation by a website about which offering to check out first because they are not prepared to look at other offers.[53] Behavioral biases may affect consumer choice no matter whether the attention intermediary is big or small. However, large incumbent attention intermediaries may be at an advantage. For example, if the relative strength of an attention

[51] See e.g. Financial Times, "Apple, Amazon and Google form alliance for smart home devices", December 18, 2019, https://www.ft.com/content/2d6add54-21b0-11ea-b8a1-584213ee7b2b

[52] The effect of the degree of competition on the addictiveness of a service is formally explored by Ichihashi and Kim (2023). Theirs is a model of rational addiction in the spirit of Becker and Murphy (1988). Additional consumer protection issues arise if addiction is not rational and consumers suffer from self-control problems.

[53] This is not to claim that such behavior is necessarily due to a behavioral bias; if the opportunity cost of time is sufficiently high, rational consumers also behave this way.

intermediary depends on combining data from many different sources and users and thus assembling deep and broad data sets, then the blind consent by consumers to give their data strengthens the market power of large attention intermediaries, whereas smaller ones may be at a disadvantage. In this sense, behavioral biases can contribute to the market power enjoyed by a firm.

Fifth, the collection of data in combination with a user base give rise to economies of scale. For example, a firm may use consumer data to manage the logistics of shipping physical goods. A smaller firm has fewer observations and is therefore less able to predict future demand. This circumstance leads to economies of scale in the delivery of products. Scale economies do not only stem from the use of data; they also arise if fixed costs are spread across more units. For example, whether its films can reach a large or a small audience matters for Netflix. By having a large subscriber base, Netflix can produce content targeted to specific niche audiences because it still has a sufficiently large number of users with specific taste to make the investment worthwhile. Large attention intermediaries can negotiate deals with content producers that provide better terms per consumer to the large intermediary compared to a smaller rival. If costs are spread across different markets or if the benefit from data accrue across markets, firms also enjoy economies of scope. Smaller competitors may be able to overcome their disadvantage in size or scope if they capture a specific audience.

Sixth, network effects may contribute to the market power of an attention intermediary. If a user's benefit depends positively on participation and usage levels of its fellow users, positive within-group network effects are present. The success of a few prominent attention intermediaries can be (directly or indirectly) attributed to positive within-group network effects. An important reason for Facebook to be attractive as a social network is that many people use it. An important reason for Google Search to be attractive is that many people use it as their primary choice of search engine; this allows Google Search to collect a lot of user data, enabling it to provide more relevant search results than small competitors. Rating systems that aggregate consumer ratings may generate data-driven network effects; for example, Amazon may benefit from this.[54]

[54] For an elaborate discussion, see Belleflamme and Peitz (2018b).

Economies of scale, positive within-group and mutual positive cross-group network effects are often automatically associated with market power. This association, however, shows a misunderstanding of their role in market competition. If participation decisions can easily be coordinated among users, then an entrant with a more attractive offer (at the same level of usage and participation than an incumbent) may be able to quickly invade a market. Although economies of scale and network effect of either type tend to lead to more concentrated markets, competition may still be very intense, with margins low or even negligible. An important concern and a reason for markets to be less competitive is that users do not easily coordinate, possibly because users do not frequently revise their usage decisions, they sign overlapping long-term contracts, or they have switching costs (see above). In this case, a temporary lead may result in a long-term lead and an entrenched position in the market.[55]

Indicators of market power can be market shares calculated on the side of attention providers. One possible metric is to calculate the share of active consumers in a given period, *e.g.*, a month.[56] Another is to calculate the accumulated time spent on a platform relative to numbers summed over all undertakings offering substitute services.[57] If an attention intermediary has consumers with an average time spent on the platform that differs from the one that applies to competing intermediaries, these two metrics differ. Otherwise, the two coincide.

[55] See Hagiu and Wright (2020; 2023).

[56] As an indicator for the intensity of platform usage, competition authorities often refer to the number of unique visitors. This is the number of contacts by different devices (identified by an IP address) in a period of time. See Franck and Peitz (2019, p. 71) for details.

[57] Using time spent on the platform as a possible metric to assess a platform's market position is also mentioned in the legislative memorandum of accompanying the finalized version of the Tenth Amendment to the Competition Act (Deutscher Bundestag, Drucksache 19/25868, 13.11.2021, Beschlussempfehlung und Bericht des Ausschusses für Wirtschaft und Energie (9. Ausschuss), see https://dip21.bundestag.de/dip21/btd/19/258/1925868.pdf. "… im konkreten Fall [kann] die Zeit, die Nutzer auf einer Plattform verbringen (sog. aktive Nutzerzeit), ein hilfreicher Indikator bei der Bestimmung einer überragenden marktübergreifenden Bedeutung sein." (p. 113) Own translation: "In the specific case, the time users spend on a platform (so-called active user time) can be a helpful indicator in determining paramount significance for competition across markets."

Taking a closer look at these metrics and linking them to revenue shares are useful as a first look at the market environment.

A large market share of attention can be seen as an indicator of market power on the side of attention providers. However, this metric may hide heterogeneity across consumers. A hypothetical example is two attention intermediaries in which attention providers single-home and attention seekers can only reach attention providers through their attention intermediary. In this example, attention providers are of two types, those who spend plenty of time with an attention intermediary and others who tend to spend little. If one attention intermediary is particularly attractive for the former and the other for the latter, the attention intermediary may have a market share of attention time far above 50 percent even though it may cater content to a smaller number of attention providers than the competing intermediary.

Looking at market shares on the side(s) of attention seekers is also useful if attention seekers singlehome. Other than market shares regarding users and attention time, the depth and breadth of relevant data may contain information about market power. An attention intermediary with access to a lot of consumer data may be able to lower its cost or provide higher match quality between attention seekers and attention providers. The intermediary with the relatively "better" data set is in a stronger position. However, constructing meaningful market shares with respect to data appears to be difficult in practice.

An important question is whether *data and attention* can constitute barriers to entry. This is the case if this gives an incumbent intermediary an advantage over an entrant. As recognized by the UK competition authority (CMA 2019, p. 188), "[t]he need of suppliers of display advertising to first grow their user base in order to gain access to consumer attention and data mean that the most important barriers to entry are faced on the consumer side of the market." Any entering attention intermediary can collect data as well and make a service proposal to consumers. The newcomer may face a disadvantage in attracting consumers (*e.g.*, because of a status quo bias of consumers, which may arise due to miscoordination of beliefs – see, *e.g.*, Biglaiser, Calvano, and Crémer 2019) and may simultaneously be at a disadvantage in monetizing consumer attention.

Attention markets may suffer from market failures other than market power. Attention intermediaries often emerge to address such market failures. However, some market failures may only insufficiently be

attenuated, whereas others even be amplified through the activities of attention intermediaries. In case the latter happens, competition authorities may intervene when the failure is caused or made more severe because of the intermediaries' market power. Otherwise, consumer protection policies and specific regulations with consumer protection concerns in mind can try to address such problems for consumers. Although the avoidance of consumer harm underpins both competition policy and consumer protection regulation, this does not imply that society can exclusively rely on these two pillars. Other public policy instruments include media regulation (which can be applied to some attention intermediaries) and sector-specific regulation of digital platforms.

Neither competition policy nor consumer protection policy may be well suited to address societal harm arising from certain externalities (in terms of instruments and/or scope). For example, excessive advertising from a society's perspective may be dealt with by specific regulations that impose an ad cap (*e.g.*, as done in the regulation of traditional media in Europe).[58] Alternatively, an ad tax for digital advertising may be introduced.[59]

Another example applies to the content that is bundled with advertising. Some consumers may like trash television, but some societies may want to regulate it because of perceived negative externalities. Regulation can serve the public good (and receive popular support) if individuals reach the conclusion that society benefits from certain content to be limited because of the adverse behavior this stimulates by some members of society.

> "But I tremble for the sanity of a society that talks, on the level of abstract principle, of the precious integrity of the individual mind, and

[58] For example, the UK regulator OFCOM spells out ad caps in its regulatory statement that was published in 2011: https://www.ofcom.org.uk/__data/assets/pdf_file/0021/19083/advertising_minutage.pdf, last accessed 19 December 2023.

[59] The state of Maryland in the U.S. introduced a tax on digital ad revenues in 2020. For the state of plays, see reporting in the press (https://www.marylandmatters.org/2023/07/12/top-court-challenge-to-digital-ad-tax-was-an-end-run-around-required-appeals-process/) and the published opinion by the state supreme court (https://www.courts.state.md.us/data/opinions/coa/2023/32a22.pdf , last accessed 19 December 2023).

> all the while, on the level of concrete fact, forces the individual mind to spend a good part of every day under bombardment with whatever some crowd of promoters want to throw at it …
>
> Subjecting a man, willy-nilly and day after day, to intellectual forced-feeding on trivial fare, is not itself a trivial matter; to insist, by the effective gesture of coercion, that a man's right to dispose of his own faculties stops short of the interest of another in forcing him to endure paid-up banality, is not itself banal, but rather a sinister symbol of relative weighting of the independence of the mind of man and the lust to make a buck." (Black, 1953, p. 962)

Even without individuals being force fed, society may want to regulate trivial fare. The society may be concerned with how individuals process certain content and therefore impose restrictions (*e.g.*, regarding violent or sexually explicit content). This course of action also applies to content considered hate speech.[60]

The concern about how certain content is processed extends to content that is factually wrong and jeopardizes how members of society live together (and how they vote in elections). Limits to the freedom of expression then imply the balancing of conflicting fundamental rights. The society or, for that matter, the legislator must provide guidance about how attention intermediaries are supposed to deal with these issues. The legislator will also have to define liabilities of attention intermediaries if they are misused by third parties trying to manipulate the behavior of attention providers as citizens in an open society. Codes of conduct and regulations can be developed to prevent or reduce certain risks, but this is not within the domain of competition law.

An important question is which role competition policy can and should play in the context of multiple policy goals and policy instruments when dealing with attention intermediaries. Despite the risk to include unrelated concerns into competition policy, the severity of some problems can be related to market power and the scale of an operation. Competition policy instruments may then be appropriate to deal with the issue (exclusively or as one of several types of policy instruments).

[60] Another issue has been the protection of minors which in an on-demand world has become more difficult than in the traditional linear programming world. Attention intermediaries may bear certain obligations in this context.

A case in point is diversity of opinion, which can be an issue on the supply side and on the demand side. Consider first the supply of news and opinion. In addition to the possible private benefits of variety, society may be better off in an environment in which different opinions are expressed and multiple media outlets attract the attention of consumers. From this perspective, merger control can be an important element to preserve diversity of opinion, and authorities may want to use a stricter standard for attention intermediaries that carry news and other information of societal value compared to other firms. A more demanding merger control regime for media (and thus the use of competition-policy instruments) is an answer. Traditionally, such a regime has been applied to media with editorial policies.[61] It can also be applied to attention intermediaries without an editorial policy in order to push against reduced diversity by algorithmic design and the ensuing supply responses.

Algorithmic design may also affect the way news is consumed even if supply were unaffected. An important caveat on the demand side is that consumers may not value diversity of opinion and instead want to see their view confirmed. In this case, with detailed data about consumer tastes, an attention intermediary may have an incentive to serve consumers according to their tastes regardless whether it has market power.[62] Then, merger policy may be ineffective and other regulatory options would need to be considered to foster a diverse consumer experience.

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[61] For a short analysis of the Springer/ProSieben merger, see Monti (2020, Section 2). As he points out, the notion of attention intermediary is useful for a better understanding of the market in which these firms operate.

[62] One concern is that some users become hooked up with extremist views. This topic merits a separate overview article. For a nuanced empirical assessment, see Hosseinmardi et al. (2021) who analyze viewing behavior on YouTube.

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