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How partners mediate platform power: Mapping business and data partnerships in the social media ecosystem

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Abstract

Social media platforms' digital advertising revenues depend considerably on partnerships. Business partnerships are endemic and essential to the business of platforms, yet their role remains relatively underexplored in the literature on platformisation and platform power. This article considers the significance of partnerships in the social media ecosystem to better understand how industry platforms, and the infrastructure they build, mediate and shape platform power and governance. We argue that partners contribute to 'platformisation' through their collective development of business-to-business platform infrastructures. Specifically, we examine how partners have integrated social media platforms with what we call the audience economy – an exceptionally complex global and interconnected marketplace of intermediaries involved in the creation, commodification, analysis, and circulation of data audiences for purposes including but not limited to digital advertising and marketing. We determined which relationships are involved, which are exclusive or shared, and identified key ecosystem partners. Further, we found that partners build and integrate extensive infrastructures for data-sourcing and media distribution, surfacing infrastructural and strategic sources and locations, or 'nodes', of power in this ecosystem. The empirical findings thus highlight the significance of partnerships and partner integrations and draw attention to the powerful industry players and intermediaries that remain largely invisible.

Keywords

Social media platforms, platformisation, partnerships, partner integrations, platform power, data intermediaries, audience economy

Introduction

Social media platforms are among the world's most profitable businesses and their digital advertising revenues depend considerably on partnerships. In 2020, Facebook and Twitter generated $84.2 billion and $3.2 billion in advertising revenue, respectively, representing 97.9% and 86.3% of their total revenue (Facebook Investor Relations, 2021; Twitter Investor Relations, 2021). As advertising has become the primary income source for social media platforms, their earnings rely on the development of both their end-user and business platform 'sides'. Moreover, advertising has developed into a highly complex and interconnected global ecosystem, including a wide range of technologies and practices driven by automated systems and applications of data and analytics. The current global digital advertising market comprises thousands of interconnected platforms and is projected to be worth $333 billion, in which programmatic advertising accounts for the vast majority (84.5% or more) of total revenue (Cramer-Flood, 2020; Perrin, 2020). Despite its significance, not enough is known about the structure of the digital advertising market, how it relates to social media, and the importance of partnerships and partner integrations.

The Observatory on the Online Platform Economy summarises that:

> the online advertising market relies on a complex ecosystem of industry players, where advertisers and publishers trade ads via a range of intermediaries including ad servers, demand side platforms (DSPs) and supply

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> side platforms (SSPs)/ad exchanges, and can resort to additional services such as data management platforms or data analytics. (Lechardoy et al., 2020: 68)

Business partnerships and alliances have become endemic to the advertising market because of its inherent fragmentation: each industry player has a particular role in the digital supply chain, while only a handful of players have multiple roles. This is especially the case for the growing ecosystem of *programmatic advertising*, where ads and audience commodities are automatically traded and served across media distribution channels and geographic regions in mere milliseconds through real-time bidding auctions of 'dizzying computational and organizational complexity' (Alaimo and Kallinikos, 2018: 110). Social media platforms are uniquely positioned within this complex ecosystem because they play a significant role both on the consumer side of the market (e.g. with access to billions of consumers worldwide, across many websites and apps) and the publisher side of the market (e.g. with sophisticated programmatic and self-serve advertising tools and advertising inventory). Moreover, they typically collect and store a wealth of data on both these market sides (i.e. about audiences, advertising campaigns, prices, etc.).

Google and Facebook (increasingly also Amazon) are known as the online advertising duopoly because they dominate the consumer ('end-user') side as well as the publisher (business) side of the digital advertising market, raising important concerns about monopoly power and antitrust (Competition and Markets Authority (CMA), 2020; US Senate Judiciary Subcommittee on Antitrust, Competition Policy and Consumer Rights, 2020). At the same time, questions remain as to where power is located precisely and how it is exercised. The United Kingdom CMA highlights the importance of Google and Facebook's large interconnected platform ecosystems, which have been key in growing 'the range of their infrastructures, technologies, products, and services' (2020: E1–E2). Similarly, van Dijck et al. (2019) call for 'nuanced analyses of power in the integrated platform ecosystem' to examine 'how platforms are behaving in relation to each other, across markets, and across societal sectors'. In short, the challenge is to situate and contextualise digital platforms and the sources and forms of their power as part of an integrated platform ecosystem, while acknowledging their interrelational and dynamic structure. Digital platform researchers conceptualise ecosystems, in a technological sense, as the collection of software apps and services 'on top of' a platform using its development tools, and, in an organisational sense, as the collection of firms and organisations that create and interact with those software apps and services (de Reuver et al., 2018). Consequently, technological and organisational analyses of platform ecosystems reveal distinct relationship structures and provide different insights about platform power.

Business software tools including application programming interfaces (APIs) and software development kits (SDKs) are at the heart of the (programmatic) advertising ecosystem. They facilitate the software development and integration work that is necessary to make programmatic advertising 'work' at a large scale. Access to these business software tools is typically governed through partner programmes. Social media platforms engage partners and form (strategic) business partnerships through partner programmes, which attract advertisers, business partners, media publishers, and content creators. Industry players require these partnerships with social media to gain privileged programmatic access to social media advertising tools, products, and services – and their massive data audiences – via these business-facing software tools. Many of these business partners are large firms that operate in various markets and industries worldwide and have software tools, products, services, and partner networks of their own. Facebook considers its integrated partners 'extensions of itself' (Dance et al., 2018); they help the platform to grow rapidly and integrate Facebook data and functionality into other software systems, marketplaces, and societal domains, whereby the platform's reach and scope are expanded. Ultimately, these partnerships and business software tools support the diversified 'data-based service ecosystems' that have helped social media become so profitable (Alaimo et al., 2020).

This article considers the significance of business partnerships in the social media ecosystem to understand how partners mediate and shape platform power. Partners contribute to the ongoing process of 'platformisation' – the technological extension and economic growth of digital platforms, transforming markets, industries, and societal domains (Helmond, 2015; Helmond et al., 2019; Poell et al., 2019) – through their collective development of business-to-business (B2B) platform infrastructures that extend the social media ecosystem. Many partners are powerful industry players with 'their own interests, business models, and bottom lines', but have remained relatively invisible to consumers (Braun, 2013: 127) and underexplored in the literature on platformisation and platform power. This ecosystem of social media and industry players is exceptionally difficult to understand, not least because of the substantial amount of specialised terminology and its constantly changing structure. Moreover, the complexity of this ecosystem poses challenges to regulators and lawmakers, who mostly focus on consumer markets (van Dijck et al., 2019).

Nonetheless, this article identifies a significant number of the public business partnerships and partner integrations that comprise this complex global ecosystem.

We present an empirical method for tracing business partnerships and partner integrations and for visualising the partner relationship networks of the 20 most-used social media. We analyse which relationships are involved, which are exclusive or shared, and identify key sources and locations, or 'nodes', of power in this ecosystem (Broughton Micova and Jacques, 2020). Industry players, through partnerships and the software integrations they build, integrate social media platforms with what we call the *audience economy* – a complex global and interconnected marketplace of business intermediaries involved in the creation, commodification, analysis, and circulation of data audiences for purposes including but not limited to digital advertising and marketing. We refer to those business intermediaries that create software tools, products, and services for shaping the creation, buying, modelling, measurement, and targeting of data audiences as *audience intermediaries* (cf. Beer, 2017; Braun, 2013; Mellet and Beauvisage, 2020; Napoli, 2003; Turow, 2005).

Our empirical approach enables consideration of how platform power and governance are dispersed and mediated by partners, the different markets and industries they partake in, and the infrastructure that runs between their industry platforms. As such, we make an empirical contribution to the literature on platform and infrastructure research (Blanke and Pybus, 2020; Helmond, 2015; Helmond et al., 2019; Plantin et al., 2018; Poell et al., 2019). Furthermore, the analysis integrates various primary sources and trade publications to contextualise the empirical findings. Using this combination of materials facilitates a growing understanding of this complex, layered, and globally interconnected ecosystem of social media and the global digital advertising market and how partnerships are endemic and essential to the business of digital platforms.

In the next sections, we first situate our contribution within the literature on platformisation and power in platform ecosystems. Second, we detail the empirical materials and methods used to identify and visualise business partnerships and partner integrations. Third, we present our empirical partnership analysis of the 20 most-used social media and, subsequently, of the audience intermediaries connected to social media, which are powerful players in the audience economy. Finally, we discuss the significance of partnerships and partner integrations in relation to platformisation and the mediation of platform power.

Platformisation and power in platform ecosystems

The technological and economic growth of digital platforms is driven not only by user growth but also by (third-party) app development (Blanke and Pybus, 2020; Helmond, 2015), (strategic) business partnerships (Alaimo et al., 2020; Helmond et al., 2019), and strategic mergers and acquisitions (Smith, 2019). In this process, a platform's 'complementors' are those individuals or organisations who create and provide complementary tools, products, or services for a specific platform (Gawer and Cusumano, 2014), including app developers, businesses and partners, advertisers and marketers, content creators, and media publishers.

Business partners, as a privileged complementor type, develop complementary apps and services, and *integrate* their own software systems or platforms with social media, giving rise to a global interconnected platform infrastructure that runs between social media and those partners. 'Infrastructure', generally, is understood as the sociotechnical system that integrates a multitude of heterogeneous components, systems, or networks by means of 'sociotechnical gateways' (Plantin et al., 2018: 7), including special APIs and software tools for partners. As such, Braun examined the growing importance of software providers and 'software infrastructures' for online video distribution, as both technological artefacts and 'social, commercial and legal strata' facilitate and constrain the distribution process (2013: 125). Building on these infrastructure notions, we characterise platform infrastructure as the technological, API-based relationship networks operating between nodes within a platform's ecosystem and beyond, as built and maintained by industry players (e.g. business partners) in particular.

As we suggest, an ecosystem perspective on digital platforms has direct implications for understanding platform power (van Dijck et al., 2019). The power of platforms is often conceived in terms of market or monopoly power (e.g. Blanke and Pybus, 2020). However, there are also infrastructural and strategic forms and sources of power that can provide 'a potential source of dominance' for platforms (Broughton Micova and Jacques, 2020). Power is dispersed and exercised through infrastructure, wherein the gateway function of APIs is an important source for this 'infrastructural power' held by platforms (van Dijck et al., 2019). Similarly, Braun highlighted the role of infrastructure in the exercise of 'structural power', influencing 'who sees what content' (2013: 126). Furthermore, platforms can accrue 'strategic power' through what Broughton Micova and Jacques (2020) call 'relationship advantages' (i.e. having direct close relationships with other actors in the network, e.g. through

partnerships) and 'opacity bias' (i.e. a lack of transparency as to how programmatic advertising 'works'). We draw on these notions of platform power to discuss the significance of partnerships that are driving the process of platformisation in the audience economy and to better understand how partners mediate and shape platform power through infrastructure development.

Platform infrastructure development

The technological extensibility of platform infrastructure is in general terms facilitated by the unique *programmability* of platforms. Platform owners stimulate and govern such development by offering platform 'boundary resources', which comprise all the software tools and information needed to build apps and services on top of digital platforms (Eaton et al., 2015), and whereby ecosystems of connected software apps and services may evolve. 'Technical' boundary resources, including APIs and SDKs, facilitate app development by exposing the platform architecture (Dal Bianco et al., 2014). APIs provide programmatic access to platform data and services and enable communication between platforms (Helmond, 2015). Importantly, APIs are not necessarily data export tools but give programmatic access to another platform's data-based services (e.g. for audience targeting, campaign optimisation, etc.). Complementary 'social' boundary resources coordinate and govern the interactions between platforms and complementors, including developer guidelines and policies (Dal Bianco et al., 2014). Taken together, these boundary resources govern the platforms' external relationships with complementors (e.g. developers, businesses, advertisers, publishers, partners, etc.) while concurrently, they ensure that their owners maintain 'infrastructural control' over that development work (Eaton et al., 2015).

Prior research on app development and platform ecosystems remains implicit about the role of complementors in the process of platformisation. Technical and market-based approaches have emphasised the multiple 'sides' of platforms and the role of complementors in 'co-creating' complementary tools, products, and services – contributing value to the platform ecosystem – facilitated by the generativity and innovation capabilities of platform ecosystems (Gawer and Cusumano, 2014). Critical media studies approaches have highlighted how developers negotiate platforms' technological affordances and constraints when building complements (Gerlitz et al., 2019) or how apps distribute data generation and valuation in platform ecosystems (Gerlitz and Rieder, 2018). Additionally, some studies have highlighted the role of complementors in platform infrastructure development by focusing on webmasters and app developers (Gerlitz and Helmond, 2013; Gerlitz et al., 2019; Helmond, 2015) or on (B2B) 'transparent intermediaries' (Braun, 2013), business developers, and partners (Helmond et al., 2019). All these complementor types, especially the business partners of social media platforms, have been driving platform infrastructure development in the social media ecosystem and beyond through the integration of platforms' software tools, products, and services into partners' own software systems to extend capabilities into specific marketplaces and industries worldwide.

Business and data partnerships

From the organisational perspective, platformisation is driven by the accrual of (strategic) business and data partnerships, which serve several purposes. In the software industry, partnerships serve to form strategic alliances, encourage complementary innovation, expand customers and market reach, gain access to external, exclusive, and specialised data and resources, prompt network effects, and manage business ecosystems and developer networks (Ceccagnoli et al., 2012; van Angeren et al., 2016). Software platforms such as Google, IBM, Microsoft, and SAP have thrived in the software industry due to their partnership models. In the social media industry, partnerships similarly serve to drive growth and facilitate access to (exclusive) data and services, markets, and industries (Helmond et al., 2019).

Additionally, in the digital advertising and marketing industry, wherein social media plays a pivotal role, it is common practice to source (or obtain access to) data through partnership agreements and to use data for purposes other than originally intended (Jarvenpaa and Markus, 2020; Marshall, 2019). Such data partnerships are formed because data is a strategic asset for many firms, supporting advertising-based business models, data-driven business operations, and AI-based tools, products, and services, which all depend on (access to) large volumes of data. Given this context, Jarvenpaa and Markus (2020) expressly call on digital platform and infrastructure researchers to focus on data sourcing and partnerships, as they are important for understanding how the relationship networks of the social media ecosystem form around such data assets (cf. Alaimo et al., 2020).

Within the audience economy, *data intermediaries* such as 'data marketplaces', 'data providers' (e.g. data brokers, suppliers, vendors), and data analytics and advertising technology ('ad tech') firms have become central players in the B2B audience economy because of the strategic importance of data (Spiekermann, 2019). These industry players – themselves platform firms – act as data intermediaries

because they shape 'the circulation and integration of new forms of data' and actively build infrastructure for data marketplaces and transactions as well as for mediating interactions and exchanges between data providers, third-party service providers, and data buyers worldwide (Beer, 2017; Spiekermann, 2019). Further, data intermediaries play a central role in contemporary 'people-based marketing', where unique customer identifiers (e.g. email addresses, phone numbers, social media logins, etc.) are used to map digital traces onto individuals, extending the process of platform capitalisation across media properties and driving new forms of data resolutions through strategic acquisitions and 'identity resolution' (Smith, 2019).

It is standard practice, if not essential, for social media and industry platforms to form partnerships with these intermediaries and with each other to make programmatic advertising 'work'. There are many intermediary types serving different purposes in this vast 'digital market infrastructure', where thousands of new industry platforms have emerged and consolidated around the acquisition, trading, and use of diverse data forms (Christl and Spiekermann, 2016; Crain, 2018; Mellet and Beauvisage, 2020; Smith, 2019). Ultimately, these market infrastructures 'affect the distribution of economic power and wealth' and 'are subject to strong network effects' (Poell et al., 2019), despite centring on what are essentially just small pieces of data (e.g. web cookies, device identifiers).

Next, we detail our materials and methods for tracing these important business and data partnerships in the case of social media to better understand the nature and structure of the global partner ecosystem.

Tracing business partnerships

Platform ecosystems are complex and interconnected entities that are difficult to study and understand. Some previous approaches for mapping platform ecosystems have used ProgrammableWeb's API directory to characterise technological, API-based ecosystems (Evans and Basole, 2016). Other approaches have used financial transaction databases, company databases, company blogs, public filings, annual reports, and news articles to find partnerships and map organisational ecosystems (van Angeren et al., 2016). Many primary sources are available in relation to the different user groups of social media platforms, including developers, businesses, and partners, that offer unique research opportunities (Helmond and van der Vlist, 2019). We use these primary sources to trace the partner relationship networks that have emerged around social media.

We focused on boundary resources offered by the 20 most-used social media worldwide (Statista, 2020) to locate relevant resources for business partners and about partnerships.[1] These types of resources provide additional advertising and marketing resources for business developers and partners, including product and training pages, partner programmes, and special APIs and SDKs (e.g. Facebook Marketing API, Facebook Business SDK, Twitter Ads API, etc.). Contrary to what is the case with most app developer resources, these business resources are exclusively accessible to approved or certified business partners and are thus governed through partnership agreements.

Social media launch partner programmes to attract partners and to solicit contributions that extend a platform's value, reach, and influence (Helmond et al., 2019; van Angeren et al., 2016). They claim that partners are 'vetted for excellence' in specific technology, advertising, and marketing-related areas and 'periodically reviewed' across '80+ points of criteria' as part of the approval or certification process.[2] Consequently, partners comprise mostly large market-leading firms in their own markets or industries. For instance, Twitter's invitation-only partner programme includes partners selected for their value-adding skills and capacities to combine 'their own enterprise tools and expertise' with Twitter's Ads API to 'create and manage high-quality ads with advanced features and capabilities' and Twitter's data partners have 'unlimited access to every data product without restriction'.[3] Similarly, Facebook's selected partners are expected to add 'measurable value' and 'build beyond' the already existing tools, products, and services provided by the core platform (Chen, 2017). While there are different partnership types, 80% of social media operate one or more marketing partner programmes, representing global communities of leading technology, service, and data providers in advertising and marketing-related areas.

Partner directories provide detailed information about those enrolled in partner programmes, including their specialities, pricing models, and the markets or industries they partake in, signalling their capabilities to potential business customers (Ceccagnoli et al., 2012). These directories are publicly accessible to anyone and are available on the platforms' business pages. They serve to showcase platforms' many types of business partners (strategic marketing partners, technology integration partners, creative partners, data partners, etc.), use cases, and provide contact details, similar to yellow pages or other types of business directories. Further, these directories are frequently updated because they serve an important role in attracting business customers who would like to advertise on social media. To facilitate this process, the traces and information about these partnerships are publicly available, even if the legal or contractual norms and details of

each individual partnership relation may not be equally available.

We used these public partner directories to trace partnerships. Among the 20 social media platforms examined, we found 36 different partner directories, listing 1549 partnerships in total. We extracted the names and details for each partner using custom-built web scrapers to derive a structured dataset using information concerning these partners' names, descriptions, logos, URLs, specialities, industries, countries, languages, service types, goals, and pricing models. Next, we focused specifically on those partners who were categorised as data intermediaries. From 67 categorised audience intermediaries, we found and scraped another 50 partner directories, listing 9941 additional partnerships and integrations, and extracted all names and relevant details. By combining both datasets, we were able to gain a sense of the overall audience economy as it relates to social media through organisational partnerships and through technological (API-based) partner integrations. Additionally, we matched our dataset to expert lists of identified data intermediaries to locate these in our network,[4] as well as to Ghostery's curated library of over 4500 tracker scripts from over 2200 companies to compare the partner and tracking technology ecosystems.[5] Firms use these embedded tracking technologies to source data from external websites and apps. We further integrate many primary sources and trade publications into our data to contextualise the empirical analysis.

The next section identifies how social media are embedded in the audience economy through different partnership types. The first part of the analysis describes the structure of the partner ecosystem, highlighting key partnership types and products and service types commonly offered – using the partners' own specialised terminology ('industry speak') where necessary. The most significant partnership and service types, in our view, are discussed thoroughly in the second part of the analysis.

Social media in the audience economy

Social media partnerships

Figure 1 presents the social media partner ecosystem, which comprises the most-used social media and their partner relationship networks. The nodes represent partner firms and organisations, while the links signify partnership relations, where each partnership represents multiple (data-based) tools, products, and services exchanged, integrated, or shared between social media and their partners. Interconnections arise when firms form partnerships with multiple social media platforms. In short, these partner relationship networks represent not only organisational arrangements of firms but also the platform infrastructure that runs between them.

Most prominently, partnerships converge around programmatic advertising, marketing technology, and data sourcing. Most partners list specialties related to advertising and marketing technologies and solutions. Facebook and Twitter's partner specialties also reveal their 'mobile-first' (advertising and marketing) strategies. YouTube, Pinterest, and Snapchat focus on content partnerships, while Facebook Messenger, WeChat, and Viber focus on automated messaging, chatbots, and payment integrations.

Most partners (79.4%) are mentioned once and deal with platform-specific features and content formats. This does not make them any less important; rather, it is a matter of what is needed for social media business models. The remaining 242 partners (20.6%) are referenced in multiple partner directories, indicating that their services span several platforms. The most connected partners (node degree count ≥ 6) are large advertising agencies (e.g. Dentsu and WPP), advertising and marketing clouds (e.g. Adobe Marketing Cloud, Oracle Marketing Cloud, and Salesforce Marketing Cloud), audience data aggregators such as data management and customer data platforms ('DMPs' and 'CDPs', e.g. eXelate, LiveRamp (by Acxiom), Oracle DMP (formerly BlueKai), and Salesforce DMP (formerly Krux)), data analytics and measurement firms (e.g. 4C Insights, Nielsen, and SocialCode), 'multichannel' advertising and marketing solutions (e.g. Adobe, AdParlor, Brand Networks, Oracle, Percolate, Salesforce, Spredfast, and Sprinklr), and customer relation management ('CRM') solutions (e.g. Adobe, Salesforce, Spredfast, and Sprinklr). They are centrally positioned either because their core business relies on partnerships and integrations with popular social media and publishers, or because they aggregate ('unify') different sources of data. They offer tools for the automation, management, scaling, and optimisation of their customers' advertising campaigns across several social media, the management of customer and brand relations, and the integration of external data sources to find and reach audiences elsewhere. Therefore, partners each add distinct value to social media by developing complementary tools, products, and services based on social media data and services.

Social media also form partnerships with (independent) third-party 'audience measurement', 'attribution', and 'verification' partners (e.g. AppsFlyer, Comscore, and Nielsen) who validate the (self-reported) metrics of one or multiple platforms. In this role, measurement partners are important for advertisers to help develop trust in a platform's reported metrics because these

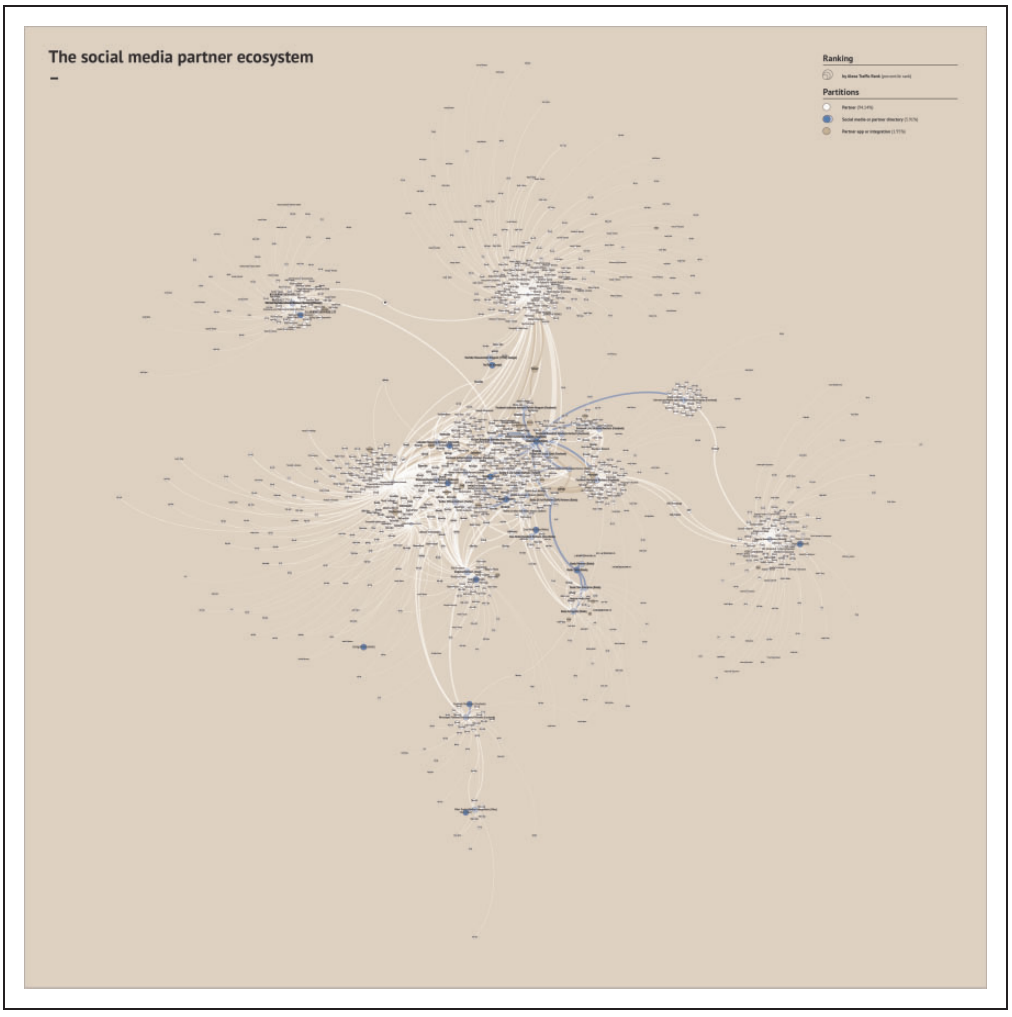

Figure 1. Social media partner ecosystem. Directed graph: nodes refer to social media partner directories ($N = 32$) and referenced partners ($N = 1177$); links refer to partnership relations ($N = 1523$).

metrics may also become 'a source of concern or even mistrust' (Broughton Micova and Jacques, 2020), as prior controversies around advertising fraud (e.g. fraudulent representations of engagement or viewership metrics) have demonstrated (Vranica and Marshall, 2016). Moreover, their privileged access led to privacy and security issues when Twitter and Facebook shared users' device data with their measurement partners (Fisher, 2019; Sloane, 2020).

Furthermore, social media commonly forge partnerships with 'audience data providers' (e.g. Acxiom, Datalogix, Epsilon, and Experian) to provide special audience targeting options (targeting 'categories', 'segments', or 'audiences') directly integrated into the platforms' self-serve advertising tools. For example, Snapchat, Pinterest, and LinkedIn offer third-party audiences in their advertising tools from their respective data partners Oracle and Nielsen, Oracle, and LiveRamp (by Acxiom), enabling advertisers to 'tap into an expansive data marketplace'.[6] Facebook and Twitter terminated this functionality after the Facebook–Cambridge Analytica data scandal and amid growing privacy concerns (Bruell, 2019). While they removed the partner targeting categories from their self-serve advertising tools, they did not end their partnerships with these audience intermediaries. Instead, they now require firms to build or purchase their own 'custom audiences' (e.g. by using partner tools) and to automatically import these audiences into social media's targeting tools using partner integrations.

For instance, key ecosystem partner LiveRamp has access to the Facebook Marketing API, which offers a 'unique integration with Facebook Custom Audiences',[7] to automatically upload custom audiences built from over 40 third-party data providers, including LiveRamp partners Mastercard and Equifax (transactions and credit data). Oracle offers similar API

integrations with Facebook and Twitter to send third-party audiences from its own data partners to social media's targeting systems (in the United States). Consequently, the industry practice of using partner targeting categories has not really changed, while accountability under the European Union (EU) General Data Protection Regulation (GDPR) 'for the provenance and permissibility of the data they are injecting' (Bruell, 2019) has shifted to partners.

Partnerships thus signal exclusive access to proprietary data and services from the 'walled gardens' or 'data silos' of popular social media. Most other competitors do not have such privileged access and thus need to work with at least one of these partner firms. For instance, Salesforce, a key ecosystem partner, has a 'Data Studio' (part of its 'Marketing Cloud'), and the company boasts that it is 'the only platform trusted by large retailers and other walled gardens for direct data deals'.[8] Additionally, 4C Insights (now Mediaocean), with its 'Closed Ecosystem Platform', promises that customers will move 'seamlessly across closed ecosystems'.[9] Access to these closed platform ecosystems is governed through partnerships and API access privileges, where long-standing API arrangements may be used to signal access, expertise, and experience. AdParlor, 'one of Facebook's very first API partners', boasts that it 'understands Facebook advertising better than anyone in the industry' due to its strategic API advantage.[10]

Accordingly, business-facing APIs are key elements of platform infrastructure that facilitate partner integrations, which they require to run 'multichannel' programmatic advertising campaigns across the ecosystem on behalf of their customers. With these integrations, partners assist their customers in finding, creating, expanding, and targeting audiences on social media and beyond. In this way, APIs enable the remote use ('activation') of social media data by partners without needing to leave the platform. For platform owners, APIs are an important mechanism of infrastructural control. Therefore, partners' positions in the ecosystem are of strategic importance because they provide and signal privileged access to exclusive social media data or services, as governed through partnerships and technical boundary resources. More generally, partnerships and integrations are what facilitate the programmable and programmatic substrates of the audience economy. They create interoperability and reduce friction between the software systems of social media and their partners. These relationship networks thus serve as a proxy for dataflow networks, wherein audience data moves (or is 'activated') between different software systems through partner integrations.

Audience intermediary partnerships

To better understand these partnerships as a source of platform power, consideration is needed of how exactly these partners – especially the data intermediaries among them – have integrated social media in the larger global audience economy. Audience intermediaries occupy central positions in digital advertising and marketing processes due to the strategic importance of data, its sourcing from third-party vendors (Jarvenpaa and Markus, 2020), and the need for data resolution in 'people-based marketing' (Smith, 2019). Data is collected, analysed, modelled, and segmented for various purposes (e.g. analytics, targeting, and credit scoring), thus serving as an important basis for partnership relations and integrations between different types of platforms. To begin understanding these relationship networks, we map which players are involved and which partnerships are exclusive or shared.

Figure 2(a) presents the partner ecosystem of audience intermediaries as it relates to social media. It displays the relationships between our source set of the 20 most-used social media and the 67 data intermediaries connected to them, resulting in an ecosystem of 6750 unique partners and integrations. Altogether, 495 (41.3%) of the identified data intermediaries appeared in this partner ecosystem. AppsFlyer (2607), Kochava (1644), Zapier (1349), Oracle (881), Microsoft (853), Acxiom (532), LiveRamp (423), Marketo (376), Segment (320), DataXu (272), Salesforce (219), SAP (198), mParticle (146), and Experian (102) were the intermediaries with the highest connectivity in this ecosystem. Our sources had, on average, 243 relationships, and we traced a total of 10,357 relationships. We found a complex relationship network where each player provided part of the service needed for digital advertising and marketing, making it nearly impossible to trace and understand where data originates, what happens to it, and where it moves over time – that is, to account for data lineages.

We further identified large advertising agencies representing leading brands,[11] digital publishers,[12] supply-side platforms ('SSPs') that aggregate publishers' advertising inventory,[13] demand-side platforms ('DSPs') used by advertisers to buy and manage advertising inventory,[14] and advertising networks and exchanges that mediate the sale and purchase of ads.[15] Among the publishers, we identified the leading social media, search engines, dating apps, and music streaming, messaging, cloud, and blog services.

All the intermediaries mediated more than half (54.1%) of the relations in our partner ecosystem and comprised the core of the global digital advertising market, particularly the (growing) market of data-centric and programmatic solutions. In this context,

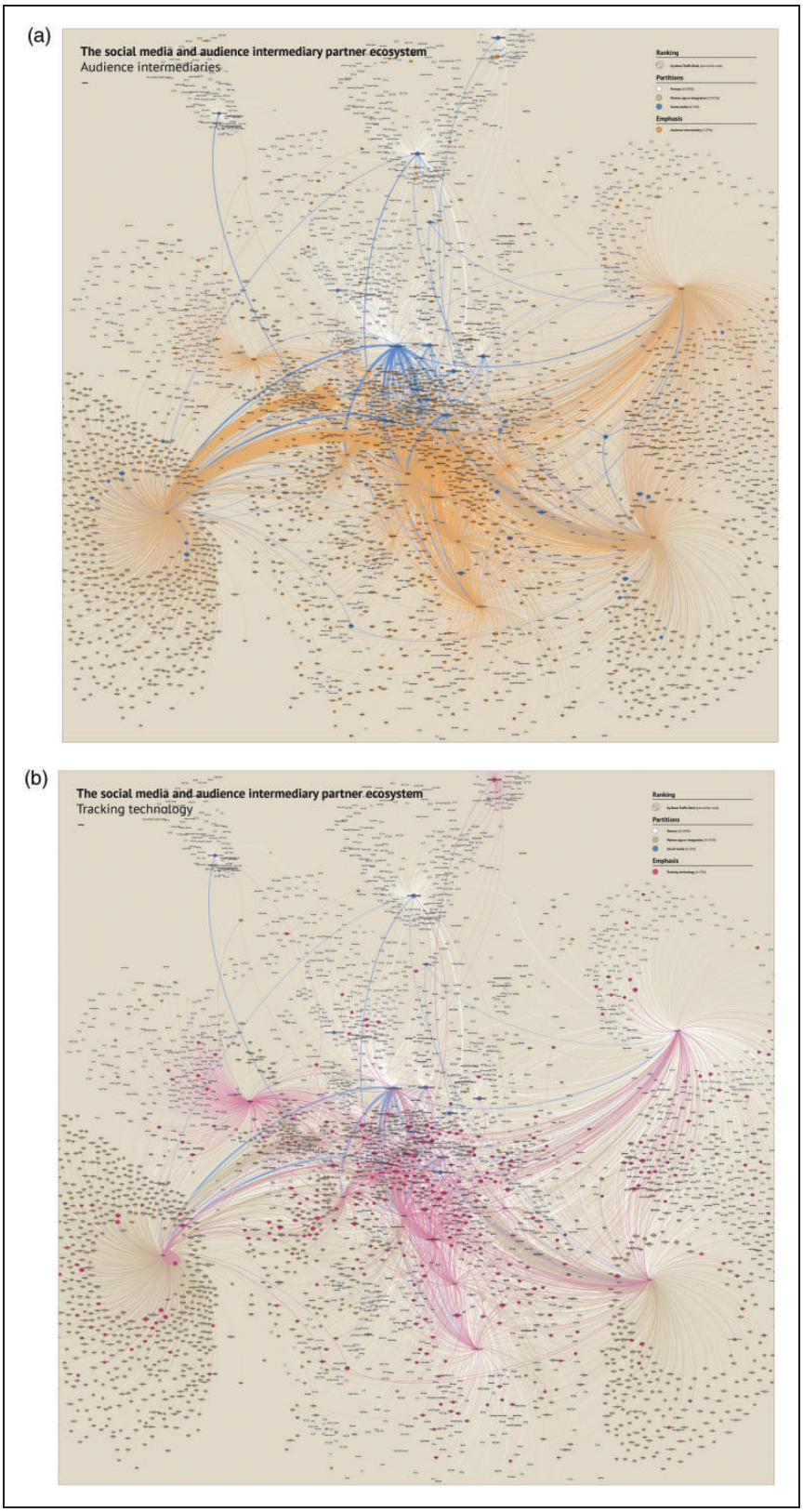

Figure 2. Combined social media and audience intermediary partner ecosystems, with highlighted (a) audience intermediaries and (b) tracking technologies. Directed graph: nodes refer to referenced partners (81.1%) and apps or integrations (18.9%) ($N = 6782$); links refer to partnership relations ($N = 9184$).

this figure indicates that the supply networks of these markets have evolved so that the tools, products, and services from one platform are commonly supplemented with data or services components from another, leading to a complex and highly interconnected ecosystem. Even the advertising duopoly of Google and Facebook, with their own self-serve advertising tools and detailed targeting capabilities, benefit from partnerships and integrations as they allow the companies to increase their revenue. Data is made valuable through partnerships and the entire ecosystem of tools and services built around that data, and not just by a single platform (however powerful).

Figure 2(b) highlights the intersections of the combined social media and audience intermediary partner ecosystems with the tracking technology ecosystem. We found that nearly 600 firms in our dataset are known to operate trackers to source data from websites and apps, including advertising (366), site analytics (108), and customer interaction (49). Among these are BlueKai (by Oracle) pixel tags and cookies, tracking 1.2% of all web traffic.[16] While its platform is barely known outside the marketing domain, it holds one of the largest audience databases with billions of records – data that was recently exposed online (Whittaker, 2020). Social media platforms such as Facebook and Twitter also have their own trackers (pixels, plugins, social logins, etc.). In the case of mobile apps, this process works through software libraries (SDKs) embedded in apps' code by mobile app developers, which ultimately 'led to a much deeper technical integration of these ecosystems', and which Blanke and Pybus contend has been 'overlooked and underresearched' (2020). Moreover, anyone using a Facebook partner can connect their partner account to Facebook and configure advertising or create audiences based on its Pixel, App Events, or conversions APIs.[17] Thus, we were able to locate how and where the tracking technology and partner ecosystems intersect and how data consolidation contributes to the formation of platform monopolies (cf. Blanke and Pybus, 2020).

Prior research has exposed trackers embedded in websites and apps and considered the implications of these dataflows (e.g. Gerlitz and Helmond, 2013). However, this aspect is only part of the story because these tracking technology firms partake in the larger ecosystem of audience intermediaries, digital advertising, and marketing technology firms. Trackers, thus, represent only one of the many data sources used for audience creation, modelling, and targeting. Therefore, to understand more effectively the movement of data and how audience intermediary partnerships mediate and shape platform power, these relationships need to be examined as more than just one part of platform-specific economies; instead, they need to be investigated as part of an ecosystem-wide audience economy, comprising countless industry platforms interconnected through partnerships. The audience economy is an infinitely more complex ecosystem composed of thousands of data intermediaries, providing hundreds of thousands of buyable audience attributes between them (Marshall, 2019).

Data aggregation and identity resolution

We found that data management and customer data platforms ('DMPs' and 'CDPs') are central audience data aggregators – and central nodes of power – in the audience economy. DMPs unify the collection, organisation, circulation, and activation of aggregate data from any source (e.g. cookies, device identifiers, IP addresses, etc.) and have, therefore, become indispensable to those offering programmatic advertising solutions.[18] CDPs have a similar role but typically aggregate identifiable 'raw' first-party data (e.g. customer names, email addresses, phone numbers, etc.). They offer 'audience onboarding', 'audience monetisation', and 'audience management' solutions to any business with a customer record.[19] Both types of audience intermediaries assemble and aggregate audiences through data provider partnerships (with data brokers, data marketplaces, or directly with businesses). Moreover, each of these data providers creates an average of 760 buyable 'audience attributes' (e.g. demographics, education, interests, etc.), which DMPs and CDPs aggregate (Marshall, 2019). For example, Oracle Data Cloud enables audience creation from multiple (acquired) sources (i.e. AddThis, BlueKai, and Datalogix), each offering distinct audiences for targeting. BlueKai is one of the largest third-party data marketplaces worldwide and provides access to data from over 1500 partners and 45,000 modelled audiences, as well as integrations with over 250 media and technology partners (e.g. digital publishers, advertising networks and exchanges, etc.). In short, DMPs and CDPs facilitate the creation, modelling, and activation of audiences, making them core infrastructure providers that power the audience economy.

DMPs and CDPs are central because of their roles as data aggregators as well as their extensive partner integration networks, enabling them to 'activate' audiences as far as their integration networks extend. Consequently, they function as gatekeepers to a universe of audiences, devices, and media distribution channels only programmatically accessible through them. For example, AppsFlyer is a mobile app analytics platform whose Universal SDK 'connect[s] advertisers to the entire mobile ecosystem' through its integration with over 5000 partners.[20] Given the strategic importance of data aggregation and partner

integration networks in the audience economy, many large firms have acquired leading audience intermediaries of their own (Smith, 2019: 6).[21] These mergers and acquisitions are not only significant because of the consolidation of data assets but also because of the consolidation of infrastructure and other assets (e.g. partnerships, integration networks, reputation, customer records, etc.), transferring their infrastructural and strategic power to their new owners.

Comparable to social media platforms, audience intermediaries differentiate their partners and integrations with speciality labels. These include distinctions based on data source types, whereby the quality and value of data depends on a firm's relation to, or distance from, the data source (e.g. first-, second-, and third-party data). Not all data is equally useful or valuable, and these differences contribute to the structuring of the partner relationship networks we traced and the digital advertising market more generally. Thus, data source distance provides important relationship benefits (i.e. strategic power). To activate audiences and run 'people-based marketing' campaigns across multiple devices and channels, it is necessary for advertisers to identify and 'unify' individuals across channels and devices. While Google and Facebook, through their login services, have access to reliable first-party data about their billions of users across devices and can offer 'people-based' targeting capabilities to advertisers, most of their competitors do not have access to such data. Instead, they can go to any audience intermediary (DMPs, CDPs, data brokers, data marketplaces, etc.) to obtain access to second- and third-party data sources. These data sources are typically less valuable because data may be sourced from external and unknown sources, where it is unclear how such data was gathered (e.g. 'declared', 'inferred', 'modelled', etc.). Moreover, data may have been processed, segmented, repackaged, or sold previously.

Many audience intermediaries offer 'identity resolution' solutions intended to match and link multiple identifiers associated with an individual to create and target customer profiles. These third-party 'identity graphs' are used to resolve identities across different devices and to facilitate 'people-based marketing'.[22] They facilitate the use or activation of audiences across partner integration networks for advertising and marketing campaigns. As such, identity resolution providers create the 'connective tissue' between the different platform types we found in the ecosystem, including data intermediaries, digital publishers, and advertising networks and exchanges. In short, identity resolution providers hold strategic and infrastructural power in the audience economy.

To counter the dominance of Google and Facebook's 'walled gardens' in the domain of identity resolution due to their vast amounts of first-party data, key ecosystem partners Adobe, AppNexus, LiveRamp, Rubicon, DataXu, Quantcast, and MediaMath formed industry alliances to create alternative open identity solutions. The Advertising ID Consortium based its solution on LiveRamp's IdentityLink technology,[23] while the DigiTrust consortium aimed to develop a 'neutral' identity solution with a common identifier based on cookies.[24] While both consortia failed, partner The Trade Desk is still actively working on an open-source identity framework 'for the open web' to replace third-party web cookies, with industry partners such as LiveRamp, Criteo, and Nielsen (Blustein, 2020). In this market environment, Smith argues, LiveRamp has become an 'essential monopoly', appealing to 'the value of data partnerships to unify consumer identities across markets' and boasting 'the largest deterministic [identity] graph on the open internet [...] on par with the largest deterministic closed internet ecosystems' such as Facebook and Google (Smith, 2019: 7).[25] In this environment, these identity resolution providers have become central and powerful players in the audience economy.

Significance of partnerships and partner integrations

Partnerships in the audience economy materialise in both organisational and technological relationships between social media and industry platforms, which makes them powerful and significant. Based on our analysis of these partnership relations, we suggest several ways in which partners and the platform infrastructure they build mediate and shape platformisation and the implications for platform power.

First, partners develop data-sourcing and media distribution infrastructures. They build and extend infrastructures for *data-sourcing* by integrating (collecting, aggregating, linking, and matching) audiences from a large variety of disparate online and offline data sources, enabling the sourcing of data, the creation and modelling of audiences, and the development of analytics services across the ecosystem. They develop infrastructures for *media distribution* (cf. Braun, 2013) by integrating (linking) a large variety of online and offline media distribution channels, enabling the programmatic buying, selling, and delivery of targeted ads and content, the 'activation' of audiences, and the measurement and attribution across the ecosystem. While the first type leads to the aggregation and consolidation of data sources (e.g. interests, purchases, searches, likes, etc.), the second type leads to the aggregation and consolidation of media distribution channels (e.g. social media, search engines, email lists, websites, apps, TV, outdoor advertising, etc.).

These infrastructures are built differently on the web and mobile media, where SDKs are commonly used (cf. Blanke and Pybus, 2020). However, strategically placed audience intermediaries such as LiveRamp unify those infrastructures through their identity resolution solutions. As such, the role of partners has become even more important with Google's decision to end Chrome support for third-party cookies (imposing its Privacy Sandbox as the alternative) and with Apple giving end-users a choice to block its Identifier for Advertisers at the app-level. These changes will have serious implications for the current structure of the partner ecosystem, the strategic positions of partners (especially those in the third-party data marketplace), and the distribution of power within the digital advertising market. Regulators warn that these changes will likely further consolidate Google and Facebook's dominance in the first-party data and digital advertising markets (CMA, 2020).

Power is not evenly distributed across the ecosystem and is, in part, the outcome of partnership governance. Ultimately, it is in the interest of players such as Google and Facebook to attain a strategic position within the industry, most effectively through strategic partnership programmes and integrations with partners' platforms, enabling them to acquire, leverage, and benefit from their strategic and infrastructural power. Only a small number of firms can build both types of infrastructure due to exclusivity as governed through partnerships. This gives such firms positions of strategic power within the ecosystem where both social media and their partners benefit from relationship advantages and the lack of transparency in their platform (Broughton Micova and Jacques, 2020). Without such partners or the infrastructure they have built, there would not be the vast 'digital market infrastructure' (Mellet and Beauvisage, 2020).

Second, any partner creates value not just for one platform but for the entire ecosystem and all its members by connecting and integrating the different ends of the audience economy. Social media partake in complex 'innovation ecosystems', wherein new value is not only generated by their own developers but also through innovation by external complementors such as partners (Gawer and Cusumano, 2014). Each partner contributes distinct value and often enhances platform growth in specific markets and industries not otherwise accessible to them, consolidating their infrastructural power (Helmond et al., 2019; van Dijck et al., 2019). For instance, we found that partners mediate trust and provide specialised advertising and marketing technology, data sources, advertising inventory, segments, and the means to target audiences. Audience data providers, in turn, also engage their own partners to further extend the reach and targeting capabilities of social media. In these ways, partners overcome existing barriers and frictions in the accessibility of social media data and services, making it easier to spend both on and off their platforms and drive advertising revenue growth. They also translate the (indeterminate) value of social media data and services to additional domains and tailor them to their own customers' needs. In short, it is apparent that platforms address and gain a foothold in specific B2B marketplaces and industries in addition to their global consumer reach, which drives revenue growth and the consolidation of strategic and infrastructural power.

More generally, social media's large scale and scope should not be taken for granted, as its status is the outcome of user growth as well as (strategic) business partnerships and partner integrations with selected industry platforms. While platform scale is typically expressed by the total number of active users, we suggest that it is also constituted in the countless technological integrations built between platforms and partners, integrating the many platform ecosystems that comprise the audience economy. Similarly, platform scope involves not just a collection of consumer-facing products and services (CMA, 2020) but also includes the diversified ecosystem of business-facing tools, products, and services complemented by partners or other firms in the ecosystem.

Finally, platform infrastructures for data-sourcing and media distribution developed by partners are typically programmable and programmatic. They are *programmatic* because they define and formalise the interactions and exchanges between a large variety of industry platforms, including audience intermediaries, DSPs, SSPs, and advertising networks and exchanges. As such, they represent the technological middleware between these platforms, enabling the large-scale automation of advertising and marketing-related solutions. These large-scale marketing automations with little oversight have facilitated the 'weaponization' of platform infrastructures by political and anti-democratic actors (Nadler et al., 2018). They are also *programmable* to the extent that any business developer can build on top of any partner's programmable interfaces (APIs, SDKs, or other), extending the reach, scope, and infrastructural power of core digital platforms. Technological relations such as these are necessarily subject to the logic of infrastructural control – boundary resources facilitate app development and simultaneously enable platform providers to maintain a firm grip on that development work (Eaton et al., 2015). This logic applies to social media app development platforms as well as to their business platforms. Therefore, API-based platform ecosystems always reflect the underlying networks of infrastructural control, and extend the sphere of corporate influence

(Christl and Spiekermann, 2016) on the business side of platforms.

The affordances of programmatic and programmable infrastructure are controlled through distinct governance strategies for app development (through boundary resources) and for business and marketing development (additionally governed through partnerships). These differences are tied to social media data and advertising-based business models. App developers can *interface with* social media using their public (open) APIs to access specific data and services. By contrast, partners can access social media marketing data and services using exclusive business-facing APIs. This possibility allows those partners to *integrate* their own enterprise software platforms and business solutions with those of social media, facilitating programmatic tools, products, and services. Unlike third-party app developers and self-serve advertisers, only partners can automate the creation, management, and measurement of ads and targeting of data-based audiences through CRM software integrations. In addition, only partners can analyse advertising campaign performance across media distribution channels using custom dashboards. Given this environment, we suggest that these partner integrations serve as a key driver of platformisation in the audience economy – one that is governed through platforms' boundary resources and partnership strategies and which consolidates the power of large social media and industry platforms.

Conclusion

This article examined the significance of partnerships and partner integrations in the process of platformisation and explored how partners mediate and shape platform power. Specifically, it focused on how the organisational arrangements between social media and other industry players based on partnerships, and the API-based software integrations that underlie these partnership relations, provide insights into platformisation and different forms and sources of platform power. We found that partnerships are significant in mediating the effects of social media in different markets and industries worldwide, particularly through key players in advertising and marketing-related areas. Within this process, we noted that platform power concerns more than market or monopoly power alone.

Partnerships are endemic and essential to the advertising business of digital platforms – and to the dominant data and advertising-based business models on the web and on mobile media. Partners expand the collection, use, and integration of audience data in other industry platforms, services, domains, and industries. Consequently, platform power is not just held by a single platform but is in part mediated by partners and dispersed within the platform ecosystem, where governance and control are exercised through infrastructure and partnership agreements. Business and data partnerships establish and govern the preferred pathways (e.g. digital supply chains) and 'nodes' of connectivity in this ecosystem, which delivers strategic and infrastructural power to a handful of social media and industry platforms. Within this process, business-facing APIs have an important gateway function and serve as a source of infrastructural control for platform owners. These partners represent diverse types of audience intermediaries with distinct business models predicated on privileged access to social media's audience data and marketing and advertising services. The advertising duopoly of Google and Facebook depends to a certain extent on their strategic position within the partner ecosystem, while strategic partners such as Acxiom, Oracle, and Experian benefit from partnerships with Google and Facebook through being among the few with privileged API access to their 'walled gardens'. Additionally, the prevalence of partnerships between audience intermediaries means that it is exceptionally difficult, if not impossible, to trace the origins and flow of audience data throughout the ecosystem.

We further found that the mediation of platform power takes many different forms, ranging from cooperation with digital platforms (e.g. partnerships, integrations, revenue-sharing deals, etc.) to forms of resistance (e.g. industry partnership alliances, open standards, advertising boycotts, etc.). Partnerships simultaneously make data widely accessible and exclusive, that is, they remove barriers and frictions in the exchange of social media data and functionality for businesses and customers, while also making it more difficult for new competitors to participate because of the consolidation of strategic and infrastructural power. Furthermore, firms acquire and leverage these forms of power through mergers and acquisitions in which they extend control over existing partnerships and partner integrations.

Platform power and governance are entangled with partnerships and platform infrastructure in significant ways. Therefore, to clearly understand where digital platforms (social media, audience intermediaries, etc.) obtain their power, and where audience data derives its value, it is necessary to understand the observable B2B relationship networks that exist between different platform types, which create a universe of middlemen and middleware (i.e. intermediaries). That is, API-based partner integration networks serve as conduits for infrastructural and strategic power. Our empirical research identified key (high-level) topological and structural characteristics of the audience economy and identified how the audience economy relates to,

or gravitates towards, core social media platforms – whether directly or indirectly through audience intermediaries. Ultimately, this critical orientation allowed us to situate and contextualise digital platforms and the sources and limits of their power as part of an integrated platform ecosystem (van Dijck et al., 2019) as opposed to using a single-platform focus.

Several areas provide opportunities for further research. First, the audience economy is larger and involves more than what was specifically addressed in this study. Our research methodology and dataset provide useful starting points to undertake additional empirical research to further improve understanding of the structure of the overall platform ecosystem and the (relative positions of) particular industry players within it. Second, the audience economy has changed rapidly due to evolving industry needs and challenges, legal and regulatory frameworks, and the many mergers and acquisitions within this ecosystem. These constant changes pose methodological challenges but also offer opportunities for tracing platform consolidation and applying evolutionary perspectives to understand individual partnerships and the overall ecosystem better (Helmond and van der Vlist, 2019). Third, this global partner ecosystem has geographical and geopolitical characteristics and implications necessitating further research that would provide an informed basis from which to compare US–European and Chinese platform ecosystems, determine how partnerships cause data to move across (international and intercontinental) borders, and (more generally) identify where data originates, is stored, and moves – a requirement under the EU GDPR. Local partnerships mediate between Chinese advertisers and major US social media platforms, with an unknown number of audience intermediary partnerships running between them, raising important questions about the geopolitics of dataflows (Wodinsky, 2020). Moreover, a network of local Chinese partners allegedly offer Oracle's technology and services to Chinese police and defense entities (Hvistendahl, 2021). Comparative studies of partnerships may reveal different sources of platform power and identify other points of intervention for activists, policymakers, and regulators.

Data availability

The data that supports the findings of this study are openly available in the Open Science Framework (OSF) at https://doi.org/10.17605/osf.io/ekum8

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Notes

1. Data collection was conducted between January and March 2018.
2. E.g. https://www.facebook.com/business/marketing-partners/ and https://partners.twitter.com/en/about-the-program
3. https://partners.twitter.com/en/about-the-program/ads-api-partners and https://partners.twitter.com/en/about-the-program/data-partners
4. We used various industry sources, including Chief Marketing Technologist Blog, Forrester Research, G2, and Crunchbase.
5. https://ghostery.zendesk.com/hc/en-us/sections/115000206793-Tracker-Library (accessed 21 June 2018).
6. https://forbusiness.snapchat.com/advertising/targeting
7. https://liveramp.com/blog/facebook-integration/ and https://liveramp.com/our-platform/data-network/
8. https://www.salesforce.com/products/marketing-cloud/data-sharing/
9. https://www.4cinsights.com/scope/
10. https://adparlor.com/platform/facebook/
11. E.g. IPG, Omnicom, Publicis Media, WPP.
12. E.g. Brightcove, Business Insider, Forbes, Roku, Wallstreet Journal, Washington Post.
13. E.g. AdMob (by Google), AppNexus, Amobee, BounceX, MoPub (Twitter).
14. E.g. Adform, Adobe, AppNexus, BrightRoll, Criteo, DataXu, MediaMath, Sizmek, Quantcast, The Trade Desk.

15. E.g. MoPub (by Twitter), One (AOL), PubMatic, RhythmOne.
16. https://whotracks.me/trackers/bluekai.html
17. https://www.facebook.com/business/help/1179210765468894?id=1205376682832142
18. E.g. DataXu (now Roku OneView), Google Audience Center, Lotame, LiveRamp (by Acxiom), MediaMath TerminalOne, Oracle DMP (formerly BlueKai), Salesforce DMP (formerly Krux).
19. E.g. ActionIQ, Blueshift, Microsoft Dynamics 365 Customer Insights, Lytics, mParticle, Salesforce Interaction Studio (formerly Evergage), Segment, Tealium AudienceStream CDP, Zeta.
20. https://www.appsflyer.com/mobile-ecosystem/productad-networks/productad-network/
21. E.g. BlueKai (by Oracle in 2014 for $1.2 billion), LiveRamp (Acxiom, 2014, $310 million), eXelate (Nielsen, 2015, $200 million), Krux (Salesforce, 2016, $700 million), Marketo (Adobe, 2018, $4.75 billion), Segment (Twilio, $3.2 billion), SessionM (Mastercard, 2019), Sizmek, Rocket Fuel, IgnitionOne (Zeta, 2019).
22. E.g. Cartographer (by Lotame), Shopper Graph (Criteo), PeopleCloud (Epsilon), Identity Graph (LiveRamp), Oracle ID Graph (Oracle), and Experience Platform Identity Service (Adobe).
23. https://www.adidentity.org/
24. https://www.digitru.st/
25. https://liveramp.com/our-platform/identity-graph/

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