LOCATING AND THEORIZING PLATFORM POWER

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Amidst popular conversations about antitrust regulation and trillion-dollar valuations, the notion of "platform power" has found firm footing in the scholarly lexicon. Media and communication scholars have tried to unpack platform power by theorizing forms of corporate control that include "algorithmic power" (Bucher, 2018), "curatorial power" (Prey, 2020), and "metric power" (Beer, 2017). These studies are complemented by research that seeks to theorize and investigate the infrastructural, organizational, and economic dimensions of corporate control (Caplan & boyd 2018; Nieborg & Helmond,

2018; Plantin et al., 2018; Srnicek 2016). Even business scholars have become more cognizant and vocal about the unprecedented clustering of capital, turning to decades old antitrust instruments to reign in platform companies (Parker et al., 2021). Likewise, scholars at the intersection of economics and geography have considered how globally operating platforms impact local labor markets (Kenney & Zysman, 2020).

It should be noted, however, that these conversations about platform power largely play out within the confines of self-defined disciplinary silos. True dialogues across the fields of media and communications, geography, economics, and management are still quite rare. This panel aims to enable such a dialogue, drawing insights from these different fields to more systematically examine how platform power takes shape and evolves. In this effort, we build on Van Dijck and colleagues' (2019) reframing of the notion of platform power. Crucially, these authors recognize that power in platform markets is *relational*, but also *highly uneven*. And they understand platform companies not as monolithic entities but as operators of complex ecosystems.

The panel locates and theorizes platform power through five case studies, focusing on: 1) video sharing platforms, 2) app stores, 3) programmatic advertising networks, 4) labor staffing intermediaries, and 5) cloud computing. Each case study starts with the question: *where* do relations of dependence take shape on the examined platform(s) and *how* are these relations organized? Addressing this question, the panelists hypothesize that platform power is exerted, codified, and operationalized around particular *infrastructural platform services*, which enable specific economic activities, such as advertising, content sharing, data analysis, labor staffing and management, cloud hosting, and so on. Leading platform companies typically own and operate a range of such services, which are tied together in unified corporate structures. We argue that each of these individual services has taken on infrastructural properties as they have morphed into ubiquitous, networked sociotechnical systems. Therefore, rather than analyzing how a platform company constitutes an all-powerful monolithic entity, the panel calls for greater specificity by locating and analyzing the set(s) of services that together constitute platform power.

In this inquiry, the panelists specifically focus on the *evolution* of platforms. Infrastructural services, such as Facebook Reels or the Apple's App Store each set standards and provide gateways for complementors–content and service providers, advertisers, data intermediaries, talent agencies–to access other institutional actors, data, and end-users. Yet, such services are also constantly adapted to local regulatory frameworks, to retain end-users and complementors, and to respond to competitors in platform ecosystems. In turn, such changes force complementors to adapt their own operations to continue offering their products and services through the platform. It is in these moments of change, when relations of dependence are reshuffled, that platform power becomes most visible.

In combination, the five case studies will provide detailed insights into how and where relations of dependence take shape in the platform ecosystem and how these relations evolve over time. This investigation not only focuses on the large US-based, but also explicitly interrogates the development of platform power from a European and Chinese perspective.

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A COMPARATIVE APPROACH TO PLATFORM POWER: MONETIZATION AND CREATOR ECONOMIES ON YOUTUBE, TIKTOK, AND REELS

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Within the realm of cultural and content production, digital platforms like YouTube, TikTok, and Facebook retain significant power (Poell, Nieborg, & Duffy, 2022). Social media platforms have profoundly transformed cultural production, in part by restricting the terms by which culture is distributed and paid for (Caplan and Gillespie, 2020). Scholars have already pointed to the dual logics at play as social media companies work to reconcile the competing needs and commercial logics of their various stakeholders – namely advertisers, media companies, and creators (Van Dijck and Poell 2013; Cunningham and Craig 2019).

This paper explores the ways that video-sharing platforms are using *monetization* and *advertiser-friendly guidelines* to negotiate and structure these competing dynamics. I will provide a comparative case study of monetization across three video-sharing platforms – YouTube, TikTok, and Facebook Reels – to examine how monetization is being used by these platforms to both entice participation by complementors and to structure that participation in ways that appeal to advertisers. This analysis pays careful attention to how monetization and "advertiser-friendly guidelines" can provide a window on the organizational and economic dimensions of platform power, and the role platforms are playing in mediating between the various parties on their networks. In an effort to interrogate the specificities of how platform power is enacted in "multi-sided markets," these case studies pay careful attention to how monetization policies are applied unevenly, and the ways that platforms stratify users and user groups in the application or adjudication of advertiser-friendly guidelines.

Three case studies

The three case studies explored in this paper examine a *push-pull dynamic* unfolding over video-sharing platforms between these companies and their users. They were chosen specifically to understand how monetization practices are converging or diverging within the video-sharing platform industry, and the responses to monetization and demonetization from creators. For each case study, I rely on publicly available documents from platform companies, including terms of service agreements, SEC filings, community guidelines, and posts from corporate blogs and websites, as well as other public statements made by company representatives. I also rely on search engine and social media trade reporting. In each case, I combine this analysis with interviews with creators and a content analysis of creators speaking about monetization on each of the platforms and on creator forums.

The first case study examines the economics and governance of the YouTube Partner Program and builds off of existing work in the field that examines the monetization and demonetization of user-generated videos (Kumar, 2019). It pays particular attention to how the YouTube Partner Program – the class of channels that are given a share of advertising revenue – has changed over time, and how this program has contrasted with reporting on other revenue-sharing agreements with established media organizations, and the role of advertiser-pressure.

The second case study looks at the launch of the "TikTok Creator Fund," an initiative which was intended by TikTok to "help support ambitious creators who are seeking opportunities to foster a livelihood through their innovative content" (Pappas, 2020). Though creators initially expressed enthusiasm for the Creator Fund, soon influencers noted their disappointment with a lack of transparency around how resources are distributed to creators and why and how users get banned from TikTok's Creator Fund for violating community guidelines. In addition to publicly available corporate documents, this case study makes use of narratives of the TikTok Creator Fund from TikTok creators, and by TikTok users who have posted to the Reddit forums /r/TikTokhelp and /r/socialmedia.

The final case study will be an overview of the monetization policies and practices of Facebook Reels, the vertical short-form video app introduced by Facebook to compete directly with TikTok (Roach, 2022). Though Reels has already been available through Instagram since 2020, the company has recently committed to make this feature available in more than 150 countries (Perez, 2022). Investing in Reels, Facebook is both adapting the revenue-sharing agreement popularized by YouTube (allowing creators to sign up for IGTV ads, enabling them to "earn a share of revenue when ads run during their videos"), as well as a similar program to the creator fund model used by TikTok, referred to as the "Reels Play bonus program" (Meta, 2022). Facebook, has also, reportedly, asked TikTok creators to post exclusively on the Reels platform (Gross, 2020). This case study relies primarily on corporate blog posts and trade reporting of Facebook Reels as it unveils these new features.

This comparative analysis of video-sharing platforms contributes two important elements to our understanding of platform power in terms of institutional dependencies (Caplan & boyd, 2018). Firstly, it provides a more detailed understanding of how monetization policies are intersecting with the application of community guidelines (Gillespie, 2020), becoming one way to both entice users to produce content, while providing a cudgel that simultaneously governs that content, often in the service of advertisers. Secondly, though there has been significant work studying institutional dependencies in terms of individual platforms (for instance, Facebook's impact on the news media industry, see Meese & Hurcombe (2020) and Napoli (2014)), there has been less research on how these dependencies unfold across the platform ecosystem,

in this case in the area of video-sharing. This research makes the case that comparative research can help bring platform power *into view*, through demonstrating how platforms react to their competitors and vie for users – creators, advertisers, and audiences.

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APP STORES AS INFRASTRUCTURAL PLATFORM SERVICES

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App stores, such as Google's Play Store or Apple's App Store, are often presented as simple app distribution mechanisms, which charge developers a hefty 30% standard commission. In this paper, focusing on the iOS App Store, we examine how app stores have become entrenched in wider platform ecosystems. Speaking to their critical institutional position, we understand these stores as vital "infrastructural platform services": they function as nodes "through which data flows are managed, processed, stored, and channeled, and upon which many other online services, complementors, and users have come to depend" (van Dijck et al., 2019: 9). Developing an institutional perspective on the app economy, we aim to investigate in detail how the App Store functions as an infrastructural service, how a variety of third parties have come to depend on this service, and how these power relations have evolved.

Over the last decade, Apple, in operating the App Store, has grappled with the tensions faced by virtually all operators of platform markets and ecosystems: those between "openness versus closedness, control versus autonomy, centralization versus decentralization, visibility versus invisibility, and stability versus flexibility" (Poell et al., 2022: 76). These constant tensions point to a process theorized as "tuning," which in the case of Apple, is "multilayered, overlapping, and on-going", involving "a distributed network of actors and artifacts" (Eaton et al., 2015: 221). In other words, the App Store is not merely a "technological infrastructure," but "turns out to be a complex cultural arrangement" (Grenz and Kirschner, 2018: 618).

To gain more insight into the evolving nature of the tuning process we distinguish in this inquiry among four different stages: 1) app development, 2) app distribution, 3) the marketing and visibility of apps, and 4) the monetization of apps, either as products or its associated services (e.g., content streaming, transportation, etc.). During each of these phases, which are ideal categories that in practice overlap, Apple aims to exert control. Vice versa, app developers and their parent companies – from entrepreneurial individuals to global platform conglomerates such Netflix and Facebook – seek to challenge guidelines, establish new norms, create exceptions, or optimize technologies to their benefit. To structure our inquiry into the tuning process we first analyzed iOS-specific "boundary resources" provided by Apple: i.e., the sanctioned tools and

interfaces, together with instructions, guidelines, and developer documentation (Ghazawneh & Henfridsson, 2013). Second, we contextualized the actions and decisions of app developers and policy makers by collecting and reviewing news articles, both newspaper reporting and industry focused outlets.

Examining relations of dependence

First, starting with the *app development* stage, we examine the environment in which iOS apps are created. Software developers have to produce a compressed software package or .ipa (iOS application archive) file (Dieter et al., 2019). iOS development is streamlined by Xcode, an Integrated Development Environment (IDE) that provides a variety of developer-oriented tools, examples, and templates, such as standardized graphical user interface elements. Next to Xcode, developers are also required to use the iOS SDK (Software Development Kit) to build and test their apps. Hence, we show how from the very moment of an app's inception, Apple has a large degree of control over an app's functionality and appearance. While such far-reaching oversight is not unprecedented – the requirement to use sanctioned SDKs has been the norm in game software development since the 1980s – in other domains of software production (e.g., open-source development) or cultural production (e.g., music or book publishing), development can potentially be platform-independent.

Second, *app distribution* is most commonly associated with the app store. After submitting an .ipa file to Apple for review, it may become available in one of the regional instances of the App Store. The review process is notoriously opaque and guided by an arbitrary, constantly shifting set of "App Store Review Guidelines" that center on "Safety, Performance, Business, Design, and Legal." For example, app developers cannot create alternative app stores or implement functionality that circumvents its build-in payment systems.

It is through these guidelines that Apple is able to shape the app *marketing* phase as well. Late 2017, Apple completely redesigned the layout of the app store from a largely top-list based design towards an editorial model that provides hand-picked selections by anonymous Apple staff. Apple also introduced "Search Ads," that mimic app store profiles, and are displayed when users search for keywords.

This brings us to the *monetization* stage. Despite regulatory interventions and antitrust litigation, Apple's default is for financial transactions (e.g., app purchase, in-app purchases, subscriptions, etc.) to be tied to one's Apple ID and for developers to pay a 30% commission. There are a few exceptions to this rule, some of which are public and codified via the aforementioned Guidelines. The tight distribution/monetization integration is constantly challenged by app developers who deem Apple's revenue cut unfair. Notoriously, the landmark case of *Epic Games v. Apple*, was an attempt by game

developer Epic to have its Epic Games Store serve as an alternative distribution channel taking a 12% fee instead.

Relational power

Examining how Apple exercises control over developers in the four stages of app production, it is important to see that it can only do so because developers adopt its software tools, choose to distribute, market, and monetize apps through its store, all the while accepting its guidelines and terms of service. This means that even in the case of the App Store, one of the most tightly governed platforms, power is never simply exercised in a top-down fashion. Platform governance is always subject to negotiations between app store owners and users, and between owners and government agencies, such as regulators. The latter negotiation is commonly bound to a regulatory window that narrowly focuses on anticompetitive practices, most prominently visible in the constant pushback against Apple's 30% revenue commission and its compulsory choice architecture. For example, a recent ruling by the Dutch Authority for Consumers and Markets (ACM) has fined Apple first for prohibiting, then complicating developers of dating apps to use alternative payment systems. Symbolically, the enforced solution for Dutch dating app developers received a regional status in the App Store, but this hardly makes a dent in Apple's infrastructural power or its position in the app ecosystem. Even if Apple was forced to adapt its monetization infrastructure, this would only have financial repercussions, but not fundamentally alter the relational balance of power in the app ecosystem.

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DATA PARTNERSHIPS: STRATEGIC AND INFRASTRUCTURAL POWER IN THE PROGRAMMATIC ADVERTISING ECOSYSTEM

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The global digital advertising market is enormous and vital to the internet and related industries, including social media entertainment, games, and journalism. Bouncing back from the corona crisis, 2021 was a record year for the global advertising industry with 780.59 billion USD in worldwide ad spending (Cramer-Flood, 2021). An important slice of this advertising pie is taken by social media companies, which rely on advertising as their primary revenue flow. Social media platforms have become central players in the advertising ecosystem by providing advertisers with access to massive yet highly-customizable targetable audiences. Social media are thus first and foremost advertising companies which do not exist in isolation, but operate within the global advertising ecosystem of thousands of interconnected platform companies that provide data-related or advertising-related services. Many of these connected platforms function as "data intermediaries" which shape "the circulation and integration of new forms of data" (Beer, 2018) and are actively building infrastructure for mediating interactions and exchanges between social media platforms and audience data providers, data marketplaces, third-party service providers, and data buyers worldwide (Spiekermann, 2019).

In this paper, we examine how social media platforms engage in *business-to-business partnerships* with data intermediaries. In the social media industry, such partnerships serve to drive growth and facilitate access to (exclusive) data and services, markets, and industries (Author et al.). These business partners do not merely assist in the business operations of social media by providing additional data or services that compliment the advertising capacities of social media platforms themselves. Rather, these partnerships are endemic to the business model of social media as partners help expand the collection, use, and integration of audience data into other industry platforms, services, domains, and industries as part of the process of "platformization" (Author; Nieborg and Poell, 2018). Through partnership arrangements and contracts, partners gain access to the business side of social media platforms, including their advertising and marketing APIs (Author et al.). This access is carefully governed and enables business partners to build technological (API-based) partner integrations to access the advertising and targeting capabilities of social media within their own software platforms. Consequently, the advertising clients of these business partners can use these social media audience targeting options, combine it with other audience data and services offered, and build large-scale programmatic advertising campaigns. These

partnerships are the central focus of our inquiry as they signal organizational and technical forms of co-dependence between social media platforms and their partners.

Examining partnerships

To examine the relations between social media platforms and their business-to-business partners as well as their dependencies, we collected the publicly listed partnerships of the top-20 most-used social media according to Statista (incl. Facebook, Twitter, Instagram, Snapchat, WeChat, QQ, Sina Weibo). Using custom scrapers, we collected the details from over 1,500 partners, including their names, descriptions, logos, URLs, specialties, industries, countries, and more. We then qualified their relationships, and examined which ones are exclusive or shared, in order to identify key sources and locations, or "nodes," of power in the ecosystem (Broughton Micova and Jacques, 2020). As partners also have partner networks of their own, in a next step, we collected almost 10,000 additional partnerships and (API-based) partner integrations the social media partners who labeled themselves as "audience data intermediaries." We then analyzed the key actors within this "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 (cf. Beer, 2017; Beauvisage and Mellet, 2020).

During our analysis we observed many mergers and acquisitions in the partner ecosystem, signaling how large firms have acquired leading audience data intermediaries of their own (Smith, 2019). As such, we find that the evolution of the partner ecosystem of social media revolves around the strategic importance of data aggregation and partner integration networks in the audience economy. These mergers and acquisitions within the partner ecosystem 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 (Author).

We find that 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 (such as marketing and advertising APIs) have an important gateway function and serve as a source of infrastructural control for platform owners.

Data assetization

To conclude, we understand the role of business partners in the process of platformization as an infrastructural process that facilitates data "assetization," in which personal data is turned into an asset through a number of processes that make data valuable "for *future* revenue streams" (Birch et al., 2021; emphasis added). Thinking through data in terms of assetization challenges the idea that data are somehow inherently valuable or useful. Instead, it shows how we may consider the role of business partners – and data intermediaries in particular – in turning audience data into a monetizable asset (Birch et al., 2021). These aspects emphasize the techno-economic and financial motivations behind the process of platformization. Specifically, we contend that platformization allows for the distributed creation of the software infrastructure by partners that is necessary to source and "activate" data from and to different places. We might even say that data functions as a medium to facilitate data-based processes between software companies, and as an interface to audiences (users) by enabling programmatic advertising, ad targeting, and other automated practices. Partners thus play a vital role in platformization because they build, extend, and sustain the infrastructures that underpin assetization through data. This also means that platform power does not only reside in or is consolidated by Big Tech platforms, but that partners also benefit from and share some of the strategic and infrastructural power in the ecosystem.

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CONVOLUTED DEPENDENCE AND DIGITAL LABOR PLATFORMS

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The question of how platforms impact labor has become a key line of inquiry across disciplines. One important focus in these debates has been research on platform-mediated labor management, which shows that control over work has become "scalable" and "distributed" (van Doorn, 2017). This has been enabled by the mobilization of economic, political, discursive, and technological resources by major platform companies, from Deliveroo and Uber to Meituan and DiDi. These labor platforms are able to centralize regulatory power while outsourcing risk and responsibilities (Vallas & Schor, 2020). Though many managerial techniques, such as labor casualization, have a long history, the so-called "platform management model" is characterized not so much by specific managerial techniques, but rather by the unstable "portfolio"-like character that is highly adaptable to "contextual requirements" (Moore & Joyce, 2019: 5–6).

An assumption underlying this line of research is that the scalability and flexibility of labor control mechanisms are achieved by labor platforms' (dis)intermediation (Langley & Leyshon, 2017). That is, they are said to replace and consolidate a wide range of functions of conventional labor market intermediaries by ways of information provision, matchmaking, and the management of work. Platform intermediation, then, is believed to play a vital role in creating platform dependency among both users and complementors.

These assumptions concerning platform intermediation or disintermediation and its relation to platform dependency, however, warrant scrutiny for two reasons. First, the focus on horizontal platform power–the ways in which platform companies bring two or more "sides" in a market to achieve infrastructural and market dominance–tends to overlook the changes happening among users on the same "side". Second, the multi-sided markets that digital labor platforms operate are far from being self-contained or self-sustaining. Research has shown that multisided platforms are dependent on existing markets (see e.g., Athique, 2019) or actors residing outside of platform markets (Vonderau, 2019).

Approach

In this paper, I question the presumed inevitability of platform intermediation thereby complicating the concept of platform dependence. I do so by examining the proliferation of labor staffing intermediaries and other types of intermediaries associated with the ride-hailing platform (DiDi) and food-delivery platforms (Meituan and Ele.me) in China. I ask: What factors contribute to the counterintuitive expansion of such intermediaries on

China's digital labor platforms? How do the shifts in labor management structures engendered by intermediaries facilitate or constrain dependence on and of labor platforms? Addressing these questions, the paper is less concerned with the actions taken by platform companies and more so with the evolving praxis of those involved in labor supply and labor management.

The paper is informed by a political economy and organizational study approach. The analysis is based on industry reports, trade publications, platform companies' public records and interviews with workers and managers employed by labor staffing intermediaries. Conceptually, I aim to expand on the notion of dependence. In the research on digital platforms, the concept of dependence has been used to refer to: 1) declining "autonomy and economic sustainability" on the part of platform complementors because of their reliance on the infrastructural platform tools (Nieborg & Poell, 2018: 4277), and 2) the significance of the institutional and political economic context that shapes a platform company's business model and strategy across geographies (van Doorn & Chen, 2021; Rahman & Thelen, 2019; Zhang, 2020).

Through theorizing what I call *convoluted dependence*, I argue that the dependent relations in the broad socio-technical system of labor platforms are more than mutual and uneven between different "sides". Instead, among users that populate one side in a market, dependency is varied, intertwined, and at times contradictory which goes beyond the platform per se.

Convoluted dependence

To further theorize the notion of convoluted dependence I will focus on three aspects in examining Chinese labor platforms. First, I will reflect on the intertwining and contentious forces of China's domestic economic restructuring and its uneven integration into global digital capitalism. The involvement of all these heterogeneous social and institutional actors fuel the country's existing, informal labor force, which provides the impetus for the growth-before-profit imperative in many labor platforms in China. I argue that Chinese labor platforms develop a distinctive managerial structure to regulate workers by incorporating and generating intermediaries. The proliferation of the practice of outsourcing through temporary staffing intermediaries suggests a path-dependent trajectory of digital labor platforms in China.

Second, labor staffing intermediaries have emerged as a vertical and networked organizational actor that is able to regulate the workforce. As a result, they have created a highly fragmented labor market wherein worker's contractual relations are obscured. On the one hand, their structural expansion in the platform economy helps precipitate a concentration of infrastructural power in the hands of platform companies to regulate a just-in-time workforce, thereby advancing their corporate interests. On the other hand, their increasing dependence on platform companies undermines their bargaining power

vis-à-vis platform companies, whereas their dependence on workers opens new space for worker' agency and activism, which, in turn, challenges and destabilizes platform power.

Third, accompanying the development of staffing intermediaries is another kind of worker-led self-intermediation akin to grassroot trade associations. Discussing a specific example of such an intermediary, I will demonstrate how the boundary of workers' platform dependence is porous and negotiable because workers are able to extend their social relations beyond the market defined and encapsulated by labor platforms. Considering the notion of convoluted dependence, this paper contributes to the debate on the loci of platform power by shifting the *horizontal focus* on power negotiated between sides in a platform market to the *vertical interactions* among actors populating one side of the market. Raising awareness to how dependence takes shape, the paper cautions against the tendency to homogenize the side(s) of platform-mediated markets.

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PLATFORM POWER AND INFRASTRUCTURE: THE CASE OF DATA CENTERS

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Scholars in internet studies and STS have demonstrated the importance of revealing the material infrastructure that sustains everyday media practices (Parks & Starosielski, 2015; Peters, 2015). This stream of research builds upon a long tradition investigating the history of the internet through its standards (Abbate, 2000; Edwards, 1996) and comes alongside innovative work revealing its hidden infrastructure (Blum, 2013; Burrington, 2016). This "infrastructure turn" in internet studies is crucial to understand how tech giants—Google, Amazon, and Facebook—expand and sustain their power over the datafication of social life (Couldry & Mejias, 2019; Plantin et al., 2018; van Dijck et al., 2018; Zuboff, 2019).

This paper shows how tech giants are becoming indispensable infrastructure—not only in the sense of utilities that are hard to live without, but as concrete brick-and-mortar infrastructure in the connectivity sector writ large. As several journalistic reports have shown, US-based tech giants are now investing massively in four connectivity sectors: subsea cables, data centers, network management software, and (to a lesser extent) non-terrestrial communication networks. Reports on this activity tend to focus, however, on the large financial or spatial scale of such projects. Using evidence drawn from the review of technical documentations, trade press, and verbatim from 30 semi-structured interviews with engineers working in these connectivity sectors, I reveal how this infrastructural turn should not only be understood as the result of large investment capacities. I show instead how they deeply change the market structure and innovation strategies of these sectors by using a wide range of strategies, such as advocating for open-source technologies and collaborations, creating industry-wide consortia, or developing white papers for technical standards.

Platform Ecosystem and Data Centers

The central hypothesis of this research is that tech giants acquire a dominant position to shape the global connectivity infrastructure by applying in this sector the platform logic that granted them their phenomenal success in the web economy. Literature in communications studies and management has already highlighted key characteristics of the platform model, e.g. inserting a new intermediary to create two-sided or multi-sided markets (Rochet & Tirole, 2003), relying on extensive data collection to generate network effects (van Dijck, 2014), or making content programmable via APIs and SDKs (Helmond, 2015; Nieborg & Helmond, 2019). The ways powerful tech giants apply this model has also been critically analyzed at length and across various sectors (Gillespie, 2010; Helmond, 2015; Poell et al., 2022; Srnicek, 2016; van Dijck et al., 2018). In this

paper, I show that the same actors now adapt this platform model to take part in infrastructural markets and to reorganize them according to their hyperscalers needs. Specifically, with the platform model, tech giants bypass incumbent companies (such as hardware manufacturers) by creating an ecosystem of complementors that they control.

The central case study for this paper will be the Open Compute Project (OCP) foundation, created in 2011 by Facebook alongside Intel, Rackspace and Goldman Sachs. The general goal of OCP is to provide an industry non-profit focused on establishing an open source hardware ecosystem for the data center market. Concretely, it means that the foundation brings together different actors of the data center industry—such as manufacturers, system integrators, clients, or software developers—and organizes their collaboration via working groups around specific topics and technologies, such as power supply, heat reuse, or network security. It organizes events, such as US- and Europe-based summits to show the results of these collaborations. It provides a licensing mechanism, a marketplace and a legal structure to allow manufacturers to sell the product of their collaboration online. In other words, the foundation aims to create an ecosystem of innovation around data center hardware.

Platform Power and Technical Standards

The dependency of existing industry actors towards this way of developing data center hardware is most visible when looking at the specific technical standards that the foundation pushes for via its ecosystem. Facebook first applied the platform model via OCP to the most basic building block of the data center as early as 2011: the cabinet, or rack, containing the server components. Traditional server cabinets are sold as vertically integrated solutions (by vendors such as HP or Dell), hence giving little customization capacities or choice of specific hardware or software to the clients. On the contrary, the very first product of OCP was an open source version of the rack, or "open rack." Revealingly nicknamed "hardware API", this rack is the basic module that complementors can use to design additional components (such as hard-drives, a switch, cabling systems), similar to the set of rules that an app store provides to third-party developers (via APIs or SDKs). Crucially, the OCP open rack also constitutes a dramatic change of standard, as it is two inches larger than traditional server racks (for a total of 21 inches instead of the traditional 19-inch cabinet), allowing users of OCP gears to insert more hardware or bigger fans, but constraining vendors manufacturing hardware fitting only traditional racks. This shows how OCP generates an ecosystem of innovation around a specific product (here, the rack) while making sure it evolves in a direction that corresponds to its specific high-performing and densely-populated server standards.

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