



Platformisation

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Abstract: This article contextualises, defines, and operationalises the concept of platformisation. Drawing insights from different scholarly perspectives on platforms—software studies, critical political economy, business studies, and cultural studies—it develops a comprehensive approach to this process. Platformisation is defined as the penetration of infrastructures, economic processes and governmental frameworks of digital platforms in different economic sectors and spheres of life, as well as the reorganisation of cultural practices and imaginations around these platforms. Using app stores as an example, we show how this definition can be employed in research.

Keywords: Platforms, Platformisation, Datafication, Multi-sided markets, Political economy, Governance

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INTRODUCTION

Globally operating platform businesses, from Facebook to Uber, and from Amazon to Coursera, are becoming increasingly central to public and private life, transforming key economic sectors and spheres of life, including journalism, transportation, entertainment, education, finance, and

health care. This transformation can be understood as a process of ‘platformisation’, which this article sets out to contextualise, define, and operationalise.

To *contextualise* the concept, we start with the notion of ‘platform’ from which ‘platformisation’ has been derived. In the first section we discuss the history of the platform concept which has seen different uses among business and scholarly communities. We highlight these differences not only to offer conceptual clarity, but also to move towards scholarly consensus. Subsequently, reflecting on initial efforts to specify the contours of platformisation, we argue that it is productive to develop a broad perspective to understand the socio-cultural and political economic consequences of this process. To that end, the second section *defines* platformisation by combining insights from four distinct research perspectives that each map onto different scholarly traditions: 1) software studies, 2) business studies, 3) critical political economy, and 4) cultural studies. The final section of the article demonstrates how platformisation can be *operationalised* in research. Building on the four scholarly traditions, we argue that the institutional dimensions of platformisation—data infrastructures, markets, and governance—need to be studied in correspondence with shifting cultural practices.

Developing this argument, it is important to keep in mind that platformisation deeply affects societies around the globe, but in the current moment it is primarily a process driven by US-based platform companies. There are regional and national exceptions, the most prominent being China, where a range of domestic platforms emerged—Baidu, Alibaba, and Tencent—marked by strong state support and oversight (De Kloet et al., 2019). Considering how US-based companies steer platformisation, we cannot do justice to the many global variations, which would require a much longer analysis. While this process everywhere involves changes in infrastructures, markets, and governance, there are crucial differences in how these changes take shape in particular countries and regions.

1. THE PLATFORM CONCEPT: DIFFERENT STREAMS OF LITERATURE

To set the context, we start with the notion of ‘platform’ from which ‘platformisation’ has been derived. The usage of the platform concept, both in academia and in business, has seen a number of key shifts since the start of the new millennium. Predating the arrival of contemporary tech behemoths, such as Google and Facebook, the fields of (network) economics and business studies already popularised and theorised the term platform, most prominently in Japan, France, and the United States (Steinberg, 2019). In the early 2000s, US companies such as Microsoft, Intel, and Cisco provided management scholars with rich examples of how to attain “platform leadership” (Gawer & Cusumano, 2002). One of the most influential contributions to this scholarship conceptualised platforms (e.g., game consoles) as “two-sided markets” (Rochet & Tirole, 2003). Platform operators aggregate, on the one side buyers or *end-users* (e.g., players) and on the other side sellers or *complementors*, such as game publishers. Later contributions incorporated work from neighbouring fields including industrial organisation economics, strategic management, and information technology. This body of work has had significant impact on business discourse and strategies deployed by platform companies, much more so than critical media perspectives.

In media and communication studies, the emergence of the platform concept evolved alongside conversations about broader shifts in communication technology, the information economy, and

the subsequent reorientation of users as active producers of culture (Benkler, 2006; Jenkins, 2006). Around 2005, the concept of “Web 2.0” entered the popular lexicon to serve as a shorthand for these shifts, signalling that the internet as a whole had become a platform for users and businesses to build on (O’Reilly, 2005). The Web 2.0 concept is best seen as a discursive exercise speaking to a business audience first and foremost, rather than an attempt to historicise any technological, economic, and socio-cultural shift in particular (Van Dijck & Nieborg, 2009). In hindsight, the concept was effective in paving the way for the further erosion of the open web or “generative Internet” towards an “appliancized network” of proprietary social network sites (Zittrain, 2008, p. 12). Services such as YouTube, Facebook, MySpace, and Twitter were increasingly hailed as social network *platforms*, constituting “a convergence of different systems, protocols, and networks” (Langlois et al., 2009).

Closely connected with the Web 2.0 discourse, early mentions of the ‘platform’ concept share a distinctive economic purpose; they served as a metaphor or imaginary, employed by business journalists and internet companies to draw end-users to platforms and simultaneously obfuscate their business models and technological infrastructures (Couldry, 2015; Gillespie, 2010). As Gillespie (2017) writes “Figuratively, a platform is flat, open, sturdy. In its connotations, a platform offers the opportunity to act, connect, or speak in ways that are powerful and effective [...] a platform lifts that person above everything else”. In this regard, the term platform should be seen as “productive” in its own right, prompting users to organise their activities around proprietary, for-profit platforms.

Parallel to the business discourses, a distinct computational perspective on platforms emerged in the late 2000s. In 2009, Montfort and Bogost launched a book series titled ‘platform studies’ with each volume dissecting a particular computational platform (e.g., the Atari VCS or the French Minitel). Collectively, these titles are attentive to the material dimension (hardware) of platforms and the software frameworks that support the development of third-party programmes, particularly games. A broader field of software studies research has been developed in parallel by scholars who foregrounded platforms as (re-)programmable software systems that revolve around the systematic collection and processing of user data (Helmond, 2015; Langlois & Elmer, 2013; Plantin et al., 2018). Research in this field is influenced by work that typically lies at the edge of traditional humanities programmes, such as computer and organisational science, information systems, and critical code studies.

While business studies and software studies research generated different understandings of platforms, these perspectives effectively complement each other: business interests and efforts to develop two-sided markets inform the development of platform infrastructures. Vice versa, platform architectures are modular in design so its technology can be selectively opened up to complementors to build and integrate their services to be used by end-users. To gain insight in platforms as both markets and computational infrastructures, it is vital to combine these approaches. Thus, we define platforms as *(re-)programmable digital infrastructures that facilitate and shape personalised interactions among end-users and complementors, organised through the systematic collection, algorithmic processing, monetisation, and circulation of data*. Our definition offers a nod to software studies by pointing to the programmable and data-driven nature of platform infrastructures, while acknowledging the insights of business studies perspective by including the main stakeholders or “sides” in platform markets: end-users and complementors.

2. (RE-)DEFINING PLATFORMISATION

The next step is to explain how the scholarly community moved from a discussion of 'platforms' as 'things' to an analysis of 'platformisation' as a process. We identify a variety of scholarly traditions that have studied this process from different angles. Although the academic disciplines we introduce below are not always consistent, nor explicit in their terminology, we can nevertheless infer a particular understanding of platformisation from their research trajectories. To develop platformisation as a critical conceptual tool, it is important to explore and combine different approaches and understandings.

The first approach we would like to focus on is software studies, which has most explicitly foregrounded and defined platformisation. Starting from the computational dimension of platforms, this strand of research is especially focussed on the infrastructural boundaries of platforms, their histories and evolution. Helmond's (2015) work has been foundational in this respect as she defines platformisation as the "penetration of platform extensions into the web, and the process in which third parties make their data platform-ready". Key objects of study include Application Programming Interfaces (APIs), which allow for data flows with third parties (i.e., complementors), and Software Development Kits (SDKs), which enable third parties to integrate their software with platform infrastructures (Bodle, 2011; Helmond, Nieborg, & van der Vlist, 2019). Together, these computational infrastructures and informational resources afford institutional relationships that are at the root of a platform's evolution and growth as platforms "provide a technological framework for others to build on" (Helmond, 2015).

The infrastructural dimension of platforms has been further explored from a software studies perspective by Plantin and his colleagues (2018), who observe a simultaneous "platformisation of infrastructures" and a "infrastructuralization of platforms". They contend that digital technologies have made "possible lower cost, more dynamic, and more competitive alternatives to governmental or quasi-governmental monopoly infrastructures, in exchange for a transfer of wealth and responsibility to private enterprises" (Plantin et al., 2018, p. 306). In this transfer, major platform companies have emerged as the "modern-day equivalents of the railroad, telephone, and electric utility monopolies of the late 19th and the 20th centuries" (Plantin et al., 2018, p. 307). From this infrastructural perspective case studies have been developed, for example on Facebook's history and evolution (Nieborg & Helmond, 2019). Here, the social media platform is understood as a "data infrastructure" that hosts a variety and constantly evolving set of "platform instances", for example apps such as Facebook Messenger and Instagram. Each app then contributes to the platform's expanding boundaries as it forges both computational *and* economic connections with complementors, such as content developers, businesses, content creators, and advertisers.

While software studies highlights the infrastructural dimension of platform evolution, business studies foregrounds the economic aspects of platformisation. The latter approach takes platform businesses as its key unit of analysis and theorises how platforms can gain a competitive advantage by operating multi-sided markets (McIntyre & Srinivasan, 2017). For platform companies, one of the advantages inherent to platform markets that can be leveraged are network "externalities" or effects (Rohlf, 1974; Rochet & Tirole, 2003). These effects manifest themselves either directly, when end-users or complementors join one side of the market, or indirectly, when the other side of the market grows. As McIntyre and Srinivasan (2017, p. 143) explain, "direct network effects arise when the benefit of network participation to a user

depends on the number of other network users with whom they can interact”. And indirect network effects occur when “different ‘sides’ of a network can mutually benefit from the size and characteristics of the other side”.

The managerial and economic blueprint for multi-sided markets theorised by business scholars invariably leads to the accumulation of capital and power among a small group of platform corporations (Haucap & Heimeshoff, 2014; Srnicek, 2016). As a counterweight to these business studies accounts, it is important to turn to a third approach: critical political economy. While most scholars in this tradition do not explicitly use the notion of platformisation, their work is vital as it signals how this process involves the extension and intensification of global platform power and governance. Critical political economists have drawn attention to issues of labour exploitation, surveillance, and imperialism (Fuchs, 2017). For example, Scholz (2016, p. 9) considers the issue of platform labour, maintaining that “wage theft is a feature, not a bug” of platforms. Considering the global footprint of platform companies, Jin (2013, p. 167) introduced the notion of “platform imperialism”, arguing that the rapid growth of companies such as Facebook and Google demonstrates that “American imperialism has been continued” through the exploitation of platforms.

Important to note is that the discussed research traditions all primarily conceive of platforms and platformisation in institutional terms, as data infrastructures, markets, and forms of governance. Notably absent is an analysis of how platforms transform cultural practices, and *vice versa*, how evolving practices transform platforms as particular socio-technical constructs. These transformations have been extensively studied by scholars working in the broader tradition of cultural studies, who mostly do not employ the notion of platformisation either, but whose work is important for understanding this process. As the cultural studies literature on platforms is very extensive—ranging from self-representation and sexual expression, to the transformation of labour relations and visual culture (Burgess, Marwick, & Poell, 2017), we cannot do justice to its full scope. We do want to stress the importance of considering platform-based user practices when analysing platformisation. A major challenge in such examinations is to trace how institutional changes and shifting cultural practices mutually articulate each other.

One body of work that is at the forefront of theorising the shifting relationships among users and platforms concerns work on labour. By introducing concepts such as “aspirational labor”, “relational labor”, and “hope labor”, cultural studies researchers have critically examined how specific practices and understandings of labour emerged within platform markets (Baym, 2015; Duffy, 2016; Kuehn & Corrigan, 2013). As Duffy (2016, p. 453) points out, newly emerging occupations, such as streamers, vloggers and bloggers, tend to reify “gendered social hierarchies”, that “leave women’s work unrecognized and/or under-compensated”. Considering platformisation from this perspective means analysing how social practices and imaginations are organised around platforms. This, in turn, shapes how platforms evolve as particular data infrastructures, markets, and governance frameworks.

Although these four approaches provide us with different *foci* and interpretations of platformisation, we would like to argue that they are not mutually exclusive (Nieborg & Poell, 2018). The observed institutional changes and shifts in cultural practices associated with platforms are in practice closely interrelated. Thus, a more fundamental and critical insight in what platformisation entails can only be achieved by studying these changes and shifts in relation to each other. Following research in software studies, business studies, and political economy, we therefore understand platformisation as *the penetration of the infrastructures, economic processes, and governmental frameworks of platforms in different economic sectors*

and spheres of life. And in the tradition of cultural studies, we conceive of this process as *the reorganisation of cultural practices and imaginations around platforms*. The next section will discuss what platformisation entails in practice and how this rather abstract definition can be operationalised in research.

3. OPERATIONALISING PLATFORMISATION: STUDYING THE IMPACT OF PLATFORMS

The different perspectives on platformisation, which we derived from the various research traditions, suggest that this process unfolds along three institutional dimensions: data infrastructures, markets, and governance. And we observed that, from a cultural studies perspective, platformisation leads to the (re-)organization of cultural practices around platforms, while these practices simultaneously shape a platform's institutional dimensions. Ultimately, the collective activities of both end-users and complementors, and the response of platform operators to these activities, determine a platform's continued growth or its demise. As pointed out by critical political economists, the power relations among platform operators, end-users, and complementors are extremely volatile and inherently asymmetrical as operators are fully in charge of a platform's techno-economic development. Moreover, network effects, together with platform strategies that frustrate attempts by end-users or complementors to leave a platform, have resulted in highly concentrated platform markets (Barwise & Watkins, 2018). While the media and telecom industries have been dominated by internationally operating conglomerates for decades (Winseck, 2008), the rapid emergence of a handful of platform companies challenges the power of industry incumbents. Poignant examples of digital dominance by platform companies can be witnessed in the new markets for digital advertising, apps, e-commerce, and cloud computing. With these considerations in mind, we propose to study the three institutional dimensions of platformisation as interactive processes that involve a wide variety of actors, but which are also structured by fundamentally unequal power relations. We will use the example of app stores to illustrate how the three dimensions can be operationalised.

The first dimension is the development of data infrastructures, which has especially been explored by software studies scholars. As a process, the development of data infrastructures has been captured through the notion of *datafication*, referring to the ways in which digital platforms render into data, practices and processes that historically eluded quantification (Kitchin, 2014; Mayer-Schönberger & Cukier, 2013; Van Dijck, 2014; and Mejias & Couldry, 2019 on *datafication*, as part of this special section). This process does not just concern demographic or profiling data volunteered by users or solicited via (online) surveys, but especially also behavioural meta-data. Such behavioural data collection is afforded by still expanding platform infrastructures in the form of apps, plugins, active and passive sensors, and trackers (Gerlitz & Helmond, 2013; Nieborg & Helmond, 2019). As such, platform infrastructures are integrated with a growing number of devices, from smartphones and smartwatches to household appliances and self-driving cars. This myriad of platform extensions allows platform operators to transform virtually every instance of human interaction into data: rating, paying, searching, watching, talking, friending, dating, driving, walking, etc. This data is then algorithmically processed and, sometimes under strict conditions, haphazardly made available to a wide variety of external actors (Bucher, 2018; Langlois & Elmer, 2013). Important to note: this datafication process is simultaneously driven by complementors, who actively integrate platform data in products and services that are used in everyday practices and

rouines. Many news organisations and journalists, for example, use social media data in editorial decision-making and in content distribution strategies (Van Dijck, Poell, & De Waal, 2018). It is through such emerging cultural practices that data infrastructures become important in particular economic sectors and activities.

One example of a ubiquitous data infrastructure for software distribution are the app stores operated by Apple and Google. Instead of downloading software applications from distributed locations, as is common in desktop-based software environments, app stores are highly centralised, heavily controlled and curated software marketplaces. In the case of Apple's iOS mobile operating system for the iPhone, iPad and Apple Watch, the App Store is the only sanctioned way for users to access third-party software, allowing Apple to track and control which apps are distributed by whom and thus, indirectly, also which data are collected, by whom, and for what purpose. This strict control over app distribution allows Apple to set technical standards and define data genres, categories, and subsequent actions. For instance, Apple's HealthKit data framework provides "a central repository for health and fitness data" on iOS devices. Of course, this repository and its related data standards only become influential because many app developers (i.e., complementors) use this functionality and thereby subject themselves to Apple's interpretation and standardisation of what counts as "health" data.

The second dimension of platformisation concerns markets, the reorganisation of economic relations around *two-sided or multi-sided markets*, which has especially been studied and theorised by business scholars. Traditional pre-digital market relations, with some notable exceptions, tend to be one-sided, with a company directly transacting with buyers. Conversely, platforms constitute two-sided, or increasingly, complex multi-sided markets that function as aggregators of transactions among end-users and a wide variety of third parties. A classic example of a two-sided market similar to the App Store is a dedicated game console, such as the PlayStation, which connects game publishers with players (Rochet & Tirole, 2003). A game platform that also lets advertisers target users, becomes a multi-sided market, connecting gamers, game publishers, and advertisers. Market arrangements like these affect the distribution of economic power and wealth, as they are subject to strong network effects. A game platform that attracts a lot of game publishers and game titles becomes more attractive for users, and *vice versa*, more users make a platform more attractive for game publishers and advertisers, with the latter generating additional income that can be used to subsidise content.

Thus, changes in market relations are not simply 'institutional', but for an important part driven by the *practices* of end-users, content producers, and other "sides" in the market, such as advertisers and data intermediaries. If many end-users suddenly embrace a new platform, as happened in the case of the smartphone, content producers and advertisers are likely to follow quickly. Yet, once end-users and complementors have been aggregated and integrated at scale, it becomes increasingly hard for other platforms to break into a particular market, or, for content and service providers to ignore platform monopolies. Whereas, for example, newspapers were for a long time successful non-digital two-sided markets attracting readers and advertisers (Argentesi & Filistrucchi, 2007), they are increasingly turned into platform complementors offering content to end-users through platforms, such as Facebook, Twitter, and Instagram, who then "monetise" this content by surrounding it with advertisements (Nieborg & Poell, 2018).

App stores also serve as examples of two-sided platform markets, connecting end-users with app developers. This market arrangement affects the distribution of power, as all app-based commercial transactions are subject to the economic imperatives set out by the Apple/Google duopoly. As app-related income is not the primary revenue generator for either platform

company, both app stores have rigid pricing standards and a relatively low barrier to market entry for developers. Consequently, app supply is high, counted in the millions. New entrants in the app economy, therefore, have become highly dependent on advertising and on selective promotion by platform operators to gain visibility in what has become a hyper competitive market. This market dynamic is reinforced by the collective practices of end-users, who rather than downloading new apps on a weekly basis, tend to stick to using around 40 apps at any time (Comscore, 2017). Important to note is that this rearrangement of market relations is intrinsically connected with the previous dimension of datafication. Because of fierce competition, app developers are incentivised to systematically collect end-user data to track and optimise user engagement, retention, and monetisation (Nieborg, 2017).

Third, platforms not only steer economic transactions, but also platform-based user interactions. This leads us to the dimension of *governance*, which has especially been put on the research agenda by political economic and software studies scholars (Gillespie, 2018; Gorwa, 2019). Most visibly, platforms structure how end-users can interact with each other and with complementors through graphical user interfaces (GUIs), offering particular affordances while withholding others, for example in the form of buttons—like, follow, rate, order, pay—and related metrics (Bucher & Helmond, 2018). This form of platform governance materialises through algorithmic sorting, privileging particular data signals over others, thereby shaping what types of content and services become prominently visible and what remains largely out of sight (Bucher, 2018; Pasquale, 2015). Equally important, platforms control how complementors can track and target end-users through application programming interfaces (APIs), software development kits (SDKs), and data services (Langlois & Elmer, 2013; Nieborg & Poell, 2018). Finally, platforms govern through contracts and policies, in the form of terms of service (ToS), license agreements, and developer guidelines, all of which have to be agreed with when accessing or using a platform's services (Van Dijck, 2013). On the basis of these terms and guidelines, platforms moderate what end-users and complementors can share and how they interact with each other (Gillespie, 2018).

As platforms tend to employ these different governing instruments—interfaces, algorithms, policies—without much regard for particular political-cultural traditions, there are often clashes with local rules, norms, and regulatory frameworks. At the same time, it should be observed that all these governing instruments have been developed and constantly adjusted in response to the evolving practices of end-users and complementors. The widespread circulation of disinformation and hate speech by end-users prompts platform operators to devise stricter policies and moderation practices, as well as algorithmic systems that can filter out this content. And, when large numbers of advertisers and content producers leave a platform, its operators will adjust the governing instruments to try to keep these complementors on board.

In our app store example, platform operators constantly tinker with their governing instruments to keep end-users and complementors tied to the platform. Google's Play Store frequently changes its algorithmic sorting mechanisms, privileging particular data signals over others to arrive at a commercially optimal ranking of apps. While external actors affect the development of governance instruments, they lack insight in how platforms design and adjust these instruments. For developers and end-users, the Play Store is a typical black box, as apps rankings are based on opaque and largely invisible algorithms. Whereas such instances of algorithmic obfuscation received a lot of public and scholarly attention, we want to emphasise that these are elements of larger governance frameworks, which need to be scrutinised in their entirety. In the case of app stores, it is the combination of controlled access to data, algorithmic sorting, and often opaque moderation practices—especially Apple has a history of unexpected

app-removals (Hestres, 2013)—that constitute its governance framework.

CONCLUSION

Taken together, the analysis of these three dimensions of platformisation enables a comprehensive understanding of how this process brings about a transformation of key societal sectors and how it presents particular challenges for stakeholders in these sectors. It is vital that we move beyond the particular *foci* of software studies, business studies, political economy, and cultural studies that have, so far, dominated the study of platforms and platformisation. We need to gain insight in how changes in infrastructures, market relations, and governance frameworks are intertwined, and how they take shape in relation with shifting cultural practices. Such an exploration is not just of academic interest. Platformisation can only be regulated democratically and effectively by public institutions if we understand the key mechanisms at work in this process.

Evidently, this short paper only provides the outline of such a research programme. Further developing this analytical framework, it is especially important to enhance our understanding of how the institutional changes are entangled with shifting cultural practices. Recent scholarship tends to focus on one or the other, which prohibits insight in the ever-evolving dynamics of platformisation. A systematic inquiry into the connections between the institutional and cultural dimensions of platformisation is particularly crucial because it will bring into view the correspondences and tensions between, on the one hand, global platform infrastructures, market arrangements, and governing frameworks, and, on the other hand, local and national practices and institutions. As political-cultural rules and norms widely diverge across the globe, the challenge is to integrate platforms in society without undermining vital traditions of citizenship and without increasing disparities in the distribution of wealth and power.

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