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Análise Econômica das Plataformas Digitais

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resumo:
A co-evolução de tecnologia e instituições, como por exemplo modelos organizacionais, por vezes acelera e cria um fosso entre os fenômenos econômicos e a capacidade dos estudiosos de analisá-los. O desenvolvimento da economia de plataformas nas últimas décadas parece ser um destes momentos. Neste artigo discutimos como a análise econômica tem respondido à transformação tecno-econômica que acompanha as plataformas digitais. Apresentamos um panorama crítico da economia e da economia política das plataformas digitais. Cada área de estudos tem respondido de uma forma distinta ao advento das plataformas. A microeconomia mainstream desenvolveu novos modelos de mercado em sub-áreas específicas, sem grandes dificuldades. Teorias microeconômicas alternativas (*e.g.*, teoria dos custos de transação) vêem seus construtos teóricos afetados pela transformação digital. Correntes de gestão e negócios se fundiram com estudos de sistemas de informação em um grande conjunto heterogêneo de novas e frutíferas abordagens. Finalmente, a economia política tem buscado acomodar os novos fenômenos em velhas matrizes interpretativas.

palavras-chave:

plataformas digitais; economia digital; economia política digital; história do pensamento econômico; métodos

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1. Introduction

Everywhere there can be a platform, there will be a platform." This is MIT's 2018 Platform Strategy Summit report announcement, right in its first page, triumphant and in capital letters. The statement of ubiquity is a reminder of the degree of diffusion of this new entity: digital platforms. However, they seem to be as elusive as they are pervasive to the digital economic landscape. Scholars are still figuring out what they are, how they come to be and whom they serve. For now, the field is filled with knowledge gaps and struggling with opposed views (especially concerning the social effects platforms entail).

One point of consensus is the central position of digital platforms in the digital era. As societies and capitalism itself mutates into a blended version of real and digital, digital platforms assume a prominent place in practice and in research. Some of them leverage digital technologies such as digitization and machine-learning algorithms to manipulate data. Others, such as cloud computing digital platforms, enable it. Mastering these technologies granted digital platforms special affordances, *i.e.*, the capacity to organize data, facilitate matchings between different user groups, automatically provide information and insights, generate predictions and reduce a whole set of market frictions, generating value in this process. Once they identified this features in the new breed of successful start-up companies, scholars labeled digital platforms as network-orchestrators (PARKER; VAN ALSTYNE; CHOUDARY, 2016) or matchmakers (EVANS; SCHMALENSEE, 2016).

Subsequent research has shown that digital platforms are a broader phenomenon. Companies are not the only creators and managers of platforms. Rather, governments and associations (OTTO; JARKE, 2019) can develop, host and maintain digital platforms. This is evidence that digital platforms are a not a class of companies, but the concurrent to become an organizational paradigm (PEREZ, 2002), that much like its predecessor (pipelines) admits variations (GAWER, 2014; GAWER; CUSUMANO; YOFFIE, 2020). The platform ecosystem comprised by the platform, its users and complementors, also varies in terms of openness, functions, *etc*. (JACOBIDES; CENNAMO; GAWER, 2018; TIWANA, 2014). From the perspective of functionality, platforms intermediate different groups. This point of view allows the comparison between modern (digital) platforms and its historical predecessors, *e.g.*, the Yellow Pages (CUSUMANO; GAWER; YOFFIE, 2019). Notwithstanding that ancestry, it is the technical perspective that changes the whole landscape. Imbued with digital technologies, modern platforms display features such as modularity and scalability (LANGLOIS, 2012; YOO *et al.*, 2012; YOO; HENFRIDSSON; LYYTINEN, 2010). Moreover, they are data-driven, *i.e.*, they can learn and improve its own performance by analyzing the data they mediate.

At the turn of the century, the dot com crisis functioned as a mechanism for selecting digital business models (PEREZ, 2009). Marketplaces (a specific type of digital platforms) such as eBay and Amazon emerged stronger from the crisis. The crisis also forced Google to improve an advertising-based business model that would become paradigmatic (and problematic). Just over a decade later, platforms had become market leaders. USA's venture capital boom in the 2010's is partly associated with the strong rise of its native digital platforms: rounds and rounds of finance provided the means to the global expansion of the American digital ecosystem. The *big five*[1] shareholders could not be happier. Digital platforms sprung in every possible sector, confirming MIT's announcement. Looking in retrospect, 2010-2020 was the decade of *platformania* (CUSUMANO; GAWER; YOFFIE, 2019). Soon, optimism gave place to criticism: a *techlash*[2]. Platforms are in the center of issues as diverse as intellectual property, monopoly power and competition policy, privacy protection, labor rights erosion and so on. The political economy tradition was one of the main perspectives launching the critical analysis towards digital platforms role in modern societies. Due to its successful criticism, several initiatives to regulate platforms are currently under development. Even so, the new practices of digital platforms had already transformed the economy, both in terms of economic theory and political economy.

The evolution of economic thought concomitantly to techno-economic transformation is a thesis

[1] Google, Amazon, Facebook, Apple and Microsoft, also known as GAFAM.

[2] "Over the past several decades, a series of extraordinary technological developments has drastically expanded human capacities to store, exchange, and process data and information. Early attempts to understand this phenomenon were often optimistic in tone […] Today's mood about these technological developments is decidedly darker, filtered through a myriad of recent revelations." (KAPCZYNSKI, 2020, p. 1462). See also "Two narratives of platform capitalism" (PASQUALE, 2016).

introduced by Perez (2002, p. 161-163) in her model of technological revolutions. Without the presumption of fitting these emerging discussions into any periodization, we draw a parallel between the new structures of accumulation and the emerging trends in economic analyses, as Perez suggested. We refer here to economic analysis[3] and not to economic thought, following Schumpeter (1987). Therefore, we draw a quick section on the definitions and typologies of digital platforms, to contextualize our subject. In the second part, we discuss how the economic mainstream canon has accommodated platform studies; finally, we approach the political economy of digital platforms through a short description of two specific approaches: the public value approach and the institutionalists.

2. Digital Platforms: definitions, functions and typologies

The definition of digital platforms, and the description of functions attributed to them, depends on the focus of those who look at it. Since platforms are flexible organizations that operate in diverse social contexts, the existence of disparate approaches is not a lack of cohesion, but a natural diversity of research streams. Digital platforms definitions usually emphasize their intermediate and technical nature: "a site of encounter where interactions are materially and algorithmically intermediated." (COHEN, 2019, p. 37); "a software-based product or service that serves as a foundation on which outside parties can build complementary products or services" (TIWANA, 2014, p. 5); "digital infrastructures that enable two or more groups to interact" (SRNICEK, 2017, p. 43). More or less detailed, more general or more specific, scholars describe platforms as digital artifacts that intermediate[4]. Some go a little further, highlighting contractual and legal characteristics, such as ownership relations and terms of use: "a platform is fueled by data, automated and organized through algorithms and interfaces, formalized through ownership relations driven by business models, and governed through user agreements" (VAN DIJCK; POELL; DE WAAL, 2018, p. 9)

For business scholars, digital platforms main function is to "bring together individuals and organizations so they can innovate or interact in ways not otherwise possible, with the potential for nonlinear increases in utility and value" (CUSUMANO; GAWER; YOFFIE, 2019, p. 13). In other words, they provide virtual consociality[5] (PERREN; KOZINETS, 2018). Their focus is on the functional aspect, usually associated with value generation properties (market enhancing and/or innovation-dynamo capabilities of platforms). The view from legal institutionalism sees platforms as "infrastructure-based strategies for introducing friction into networks" (COHEN, 2019, p. 40). While economists are enthusiasts of the transaction cost reduction achieved by platforms, Julie Cohen emphasizes that platforms provide access between different groups and legibility of users to those seeking its attention. In other words, she sees the function of the platform as enabling capital accumulation in a previously inadequate, disorganized, networked context. Langlois (2012) advocates a universal perspective, as he affirms that digital platforms main function is to hide complexity: Networks encapsulate a great potential value, both of increased interaction between suppliers and buyers, but also through new combinations for innovation. However, coordination problems arise due to information exchange overload. Platforms then create thin crossing points, where information density is condensed. These examples show how the attribution of functions to digital platforms will depend of the researcher perspective of choice.

A robust typology comes from the context of the private sector, addressing digital platforms that are traditional for-profit companies: innovation, transaction, and/or hybrids (CUSUMANO; GAWER; YOFFIE, 2019). Transaction platforms are "intermediaries or online marketplaces that make it possible for people and organizations to share information or to buy, sell, or access a variety of goods and services" (CUSUMANO; GAWER; YOFFIE, 2019, p. 20). In other words, the transaction platform has a fixed value proposition, which rests in the service of providing connection between two (or more)

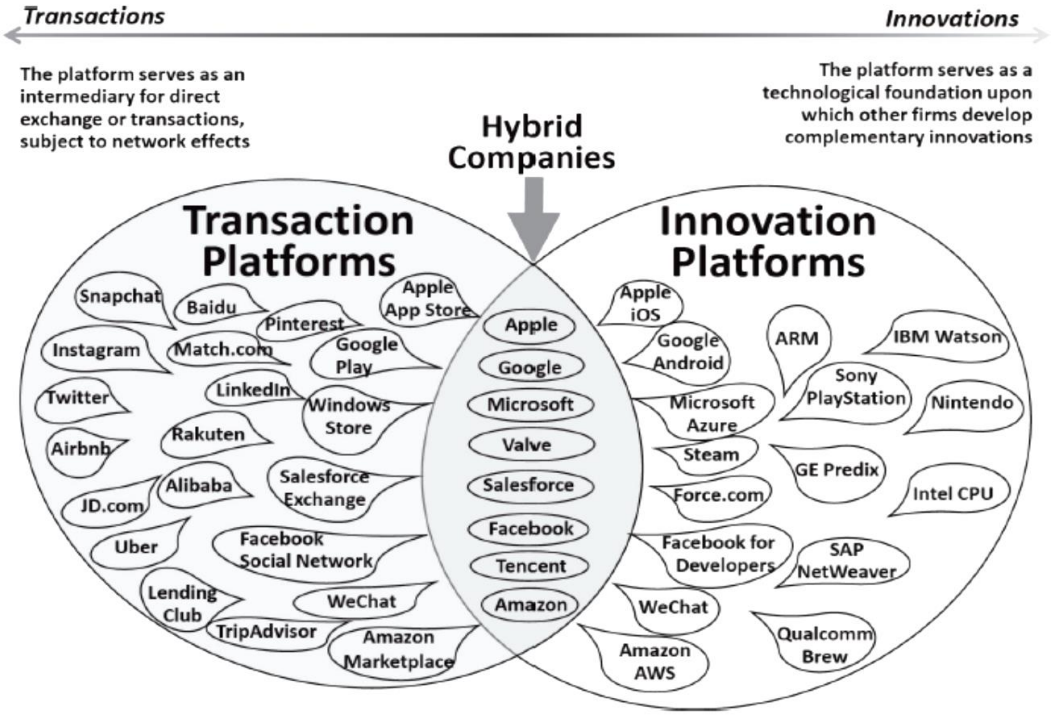
[3] "We shall, of course, never neglect the general environment of economic thought in which, at various times, analysts did their work. Nevertheless, these environments and their historical changes are never our main object of interest. They come in as favorable or inhibiting influences upon analytic work, which shall remain the hero throughout our play" (SCHUMPETER, 1987, p. 37)

[4] For the traditional uses of the term 'platform' (computational, architectural, figurative and political), see Gillespie (2010).

[5] "the physical and/or virtual copresence of social actors in a network, which provides an opportunity for social interaction between them" (PERREN, KOZINETS, 2018, p. 23).

specific groups[6]. The other type is the innovation platform, defined as "common technological building blocks that the owner and ecosystem partners can share in order to create new complementary products and services" (CUSUMANO; GAWER; YOFFIE, 2019, p. 18). Elaborating on that, the special feature of innovation platforms is that its value proposition is fluid. Developers and entrepreneurs do not know beforehand exactly what type of service will be created and reach the end-user. That open frontier of functions (and value) is the result of digital generativity. Once we understand that, it becomes clear why the most valuable companies in the world employ innovation platforms (see Figure 1). Kim and Min (2019), using a robust pattern-matching technique, propose another typology based on platform's value stream. They find three main types of platforms: suppliers, tailors and facilitators.

Figure 1 – Two types of digital platforms



Source: Cusumano, Gawer and Yoffie (2019, p. 19).

Cusumano, Gawer and Yoffie (2019) observe that their categories are not exclusive. Innovation platforms may develop a transaction branch. The opposite also can be true. They even propose ways that platform-owners might follow to successful achieve this hybrid type of platform. Besides the transaction and the innovation, Cennamo (2019) adds a third category called information platforms. Even though his criteria is not so clear, it might be a useful distinction, especially in the case of government regulation. Platforms that fit this category (usually social networks or search engines) influence the formation of public opinion and intermediation of news, acting as gatekeepers of knowledge and information in digital society (VAN DIJCK; POELL; DE WAAL, 2018). Other initiatives are still in its early attempts of creating original taxonomic systems (BLASCHKE *et al.*, 2019), or restrict their scope to a specific sub set of platforms, such as marketplaces (PERREN; KOZINETS, 2018; TÄUSCHER; LAUDIEN, 2018) or digital applications (GHAZAWNEH; HENFRIDSSON, 2015).

Although for-profit platform research initiated incursions on typology designing, non-profit platform research might be taking off as well. The cry for cooperative platforms as an alternative to the corporative domination of digital platforms has produced some interesting insights. Cooperative digital platforms may come in different versions such as cooperatively owned, city-owned, producer-owned or union-backed (SCHOLZ, 2016). While public platforms might also become a common element of digital government era, public platform typologies are still in its first stages of development (ANSELL; MIURA, 2020; ZULFA *et al.*, 2016).

[6] "The variety of such online matching markets is extraordinary: workers and firms, buyers and sellers, investors and entrepreneurs, vacant rooms and travelers, charities and donors, dog walkers and dog owners, etc." (GOLDFARB; TUCKER, 2019, p. 10)

3. The economics of digital platforms

Two-sided markets, the type of markets intermediated by digital platforms, are not a new phenomenon. Actually, they are quite old. From Greek trade zones to medieval Champagne fairs, history is full of examples of two-sided markets (EVANS; HAGIU; SCHMALENSEE, 2006; EVANS; SCHMALENSEE, 2016; FISMAN; SULLIVAN, 2016). Alvin Roth wrote *Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis* in the distant year of 1990. A real-world problem solver, Roth later redesigned public schools systems in New York and Boston to match students and schools; he improved New England's program for kidney exchange, to better match donors and recipients; and overhauled the National Resident Matching Program (NRMP) to allocate medical workers in public hospitals. A master of game theory, which he applied to the design of matching markets, he would receive the Nobel Prize of economics in 2012 "for the theory of stable allocations and the practice of market design". He won the prize at the same time when it became evident that digital platform's algorithms were excellent at automatically doing what Roth had done 'by hand': network coordination and market design.

Digital platforms display significant economic impact since the 1970's (EVANS; HAGIU; SCHMALENSEE, 2006). Despite their economic relevance, there was a real gap in economics research about this topic: "In 1998, this important type of business didn't have a name […] Economists didn't have a clue how these businesses worked" (EVANS; SCHMALENSEE, 2016). During the 1990's, management scholars started to systematize platform studies as business models with specific features and patterns (CUSUMANO; YOFFIE, 1998), even identifying features of a proto platform organization (CIBORRA, 1996). Economists studying digital economics labelled a specific agent "cybermediaries" (CAILLAUD; JULLIEN, 2001). In terms of theory however, the research field would have to wait until the turn of the century for Jean Rochet and Jean Tirole to formalize two-sided markets theory (ROCHET; TIROLE, 2003, 2006).

In their seminal contribution, Rochet and Tirole built on the previous literature of industrial organizations to sustain a specific market structure for two-sided markets[7]. They emphasized, "From both positive and normative viewpoints, two-sided markets differ from the textbook treatment of multiproduct oligopoly or monopoly" (ROCHET; TIROLE, 2003, p. 991). Therefore, they went on to investigate whether it was possible to derive a formalized model for this market form: they have demonstrate the centrality of price decomposition between both sides of the market as the specific mechanism of pricing. Their seminal contribution led to a great number of studies that have extended their scope and introduced new methods, sometimes next to the central problem of optimal pricing (CABRAL, 2019) and others exploring emerging topics, such as asymmetric information and firm's strategy (HAGIU; WRIGHT, 2015). The theory of two-sided markets bequeathed an instrument that underpinned a completely new stream of research, in recent years widely disseminated in vehicles such as the *International Journal of Industrial Organization*.

The contribution of Rochet and Tirole coupled with the efforts of other pioneers such as Jullien, Armstrong and Caillaud, made the area of industrial organization one of the busiest in economics since the beginning of the century. This research community mobilizes empirical research methods and theoretical models (XUE; TIAN; ZHAO, 2020). Empirical studies, in general case studies (single or comparative), provide the standards for formulating and testing the validity of theoretical models. The models are based on several assumptions, such as perfect competition, imperfect competition

[7] The authors recognize that the theory of two-sided markets is based on (i) multiproduct pricing and its cross-elasticities (branch of industrial organization) and (ii) network economics. Network effects is the logic that sustains digital platforms: a network generates more value to each user the more users belong to that network (KATZ; SHAPIRO, 1985). When only a few users log in to Google +, there is not much value accreted to each user. When billions of users log in to Facebook, each user can form a tremendous quantity of links, thereby deriving a great amount of value. There are four types of network effects: same side effects (positive or negative), when new users in one side of the market generates value to the same side (as in the case of social networks mentioned above); cross-side effects (positive or negative), *e.g.*, for an advertising company, every new user of Facebook increases the value of the network. Those are both positive network effects, but there are also negative network effects. Sometimes, more users diminish the value of the network, as when there is an excess of Uber drivers, for example, crowding out some of the drivers since remuneration falls and trips become harder to find. In a similar fashion, too many advertising in a platform may cause that "the positive impact of expanding producer choice may be transformed into a negative cross-side effect that turns off consumers and damages the platform's value" (PARKER; VAN ALSTYNE; CHOUDARY, 2016, p. 31).

(monopolies, duopolies), homogeneity or heterogeneity of users, product differentiation, possibility for the user to transition from platforms (multihoming), pricing via fees or subscriptions, etc. The modeling follows classic game theory instruments such as Bertrand games (CAILLAUD; JULLIEN, 2003), but also computational modeling. The two decades of research in this area have bequeathed insights into pricing, strategy, competition standards and their relationship with antitrust, gains in well-being for consumers, as well as dynamic models of digital platforms.

It is noteworthy that, having faced the reality of platform economics, mainstream economic science has not undergone any restructuring of its epistemological or methodological premises. Goldfarb and Tucker (2019, p.3), state categorically "Understanding the effects of digital technology does not require fundamentally new economic theory." Some argue that the 'New Economy' did transform some industries, but nothing that could not be treated with the same economic tools as always: “economic laws did not change. We could still understand everything in terms of supply and demand and could set strategy, inform policy, and anticipate the future using off-the-shelf economic principles” (AGRAWAL; GANS; GOLDFARB, 2018, p. 11). Other authors go so far as to claim that the advent of digital platforms has solved some of the most serious theoretical flaws in classical microeconomics, such as the exogeneity of prices and quantities and the coordinator role of market intermediaries (SPULBER, 2019).

On the other hand, alternative economic theories seem to have been put to the test since the emergence of digital platforms. The reason is simple. Mainstream microeconomic theory is unaffected by changes in the constitution of what firms are, because firms are only functions of production in their theoretical building. In the era of the digital economy, traditional microeconomic theory simply continues to sustain the firm's invisibility (GAWER, 2020). Alternative theories, which seek to develop improved theories of the firm “which is not only realistic in that it corresponds to what is meant by a firm in the real world, but is tractable by […] powerful instruments of economic analysis” (COASE, 1937, p. 386), need to incorporate radical changes. Meyer-Schönberg and Ramge (2018) captured the changes in the nature of the firm ascribed by new technologies. In an information-rich reality, markets are no longer parameterized by just a single variable, *i.e.*, price, and become data-rich markets. Thus, they allow for better transactions and make certain functions that were previously more efficient in the framework of firms obsolete. In response, firms adapt organizationally, inserting the DNA of markets into their structures: they become more fluid, flexible and horizontal, *i.e.*, they become platforms. Wagner (2020) points out how platform-embodied AI develops autonomously from a certain point and makes economic decisions. Therefore, it has become a new production input: machine work. This new AI agency brings implications for the prospects of firm’s boundaries, integration and transaction costs within and between firms.

Regarding specifically Transaction cost theory (TCT), digital platforms mitigate search, bargain and decision costs in the three stages of closing deals: pre-business, business and post-business (LOBEL, 2018). In the theory of transaction costs originated by Coase (1937), these high costs generate long-term uncertainties and promote/legitimize the firm's existence. In the absence of these costs[8], resorting to the hierarchical governance mechanism as opposed to market failures would lose strength as an explanatory theory of the existence of the firm in the view of some (BARONIAN, 2020). Others argue that digital platforms are just an organization between the extremes of the hierarchy and the market continuum, which do not affect the validity of the TCT's propositions (AUTENNE; DE GHELLINCK, 2019). The TCT seems to remain relevant as a source of explanation for organizational formats, but in fact, it seems inadequate to explain (as it had done, in a negative way) the nature of the firm in the digital age. TCT and its derived theory of the firm is a product of its time: “By defining the firm as a mode of coordination alternative to market and as a solution to market failures, Coase’s theory is closely related to a specific phase of capitalism during which “The Nature of the Firm” was written.” (BARONIAN, 2020, p. 219).

[8] Digital platforms affect transaction, inventory and process costs (KIM; MIN, 2019); search, replication, transportation, tracking and verification costs (GOLDFARB; TUCKER, 2019). On the other hand, costs associated with reading, screening and signaling have become central in the platform economy (TIROLE, 2020).

BOX 1 – Business and Information Systems Approaches to Digital Platforms

Despite their achievements, economics has left to many questions related to the platform's universe outside of its scope. According to Gawer (2014), mainstream economics applies only to transaction platforms, one of the types previously described. That's due to the fact economics is focused on pricing and cross-subsidization, but has not much to say about generativity and other innovation-related aspects of digital platforms (DE REUVER; SØRENSEN; BASOLE, 2018, p. 126) After Tirole and Rochet's publication, there was a steep increase in yearly peer-reviewed publications in the field, but a great part of it is business-oriented. Since related research streams are still under formation, it is rather common to see some overlapping subjects among different sub-groups (more management-prone or economics-prone), as well as some cloudiness of the research agenda (MCINTYRE; SRNIVASAN, 2017). One of the positive impacts of the business community engagement in the economic debate on platforms is their orientation towards real-world problems. As such, when problems for firms and real world strategy became multifarious, business scholars were there to investigate and theorize on it.

Mainstream economic analysis is usually restricted to issues related to pricing, competition and strategy. Studies in the other streams combine business and management with information systems research. This current of studies privileges the empirical approach. In general, it develops typologies that organize the field of digital platforms; establishes relationships between governance styles (decision rights, control mechanisms, proprietary vs. shared), architecture (decomposition, modularity, design rules), environmental dynamics (convergence, multihoming costs, influence of complementors) and, ultimately, competitiveness (degree of innovation; number of users; engagement of complementors; market dominance) (TIWANA; KONSYNSKI; BUSH, 2010).

Information systems studies have studied digital platforms for decades, when they were still concentrated in the telecommunications and computing sector. Its functional and technical perspective (DE REUVER; SØRENSEN; BASOLE, 2018; TIWANA, 2014) has a lot to do with the organizational vision that will be formed from the 1990s onwards. It is the IS studies that will provide the inductive basis for organizational models such as Baldwin and Woodard (2009). These works translate the technological possibilities of platform systems to the organizational reality of companies or institutions. Therefore, if from a technical point of view, every platform is composed of a fixed core and variable elements (BALDWIN; WOODARD, 2009), one of the consequences for management is to decide which elements may vary.

This translation of technological elements into organizational elements took time. For some time, studies still classified platforms as internal to the firm or related to the supply chain (GAWER, 2014). In fact, the question about the basic organizational elements that distinguish the digital platform from other models was only settled in (HAGIU; WRIGHT, 2015). They demonstrate how (i) enabling direct interactions between two or more distinct sides and (ii) each side being affiliated with the platform, differentiate the digital platforms from similar models, such as vertical integration. That said, there was (and still is) a universe of unanswered questions about how the multiple notional configurations of digital platforms generate results in the real business context.

Saadatmand, Lindgren and Schultze (2019) offer an archetypal study of this issue, when investigating how different architectures of a shared platform implied different degrees of engagement of complementors. Its case study is also illustrative of the complexity present in the possible configurations of the platforms. The multidisciplinary nature of the subject allows for a great number of possible theoretical lens. Tiwana, Konsysky and Bush (2010) recommend modular system theory, evolutionary selection, real options theory and bounded rationality as adequate theoretical lens to approach the organizational and business aspects of platforms. Tura, Kutvonen and Ritala (2018) opt for a design science approach. The tendency to adopt any of these theoretical options or to remain closer to the pure MSP theory will depend on the focus of the study, whether more interested in business and management or in the technical aspects. In terms of analytical tools, the options are also diverse. Saadatmand, Lindgren and Schultze (2019) employ action research methods. There are many variations of case studies. Other studies prefer to rely on econometric (CENAMOR; FRISHAMMAR, 2021) or mathematical models (ECONOMIDES; KATSAMAKAS, 2006).

The initiatives above helped paved the way for a new research area in economics of digital platforms that is still developing. In this process, they have found, sometimes unexpectedly, critical questions that exceeded the scope of their investigations or disciplines. A curious case refers to two versions of the same paper by Jean Rochet and Jean Tirole (2004; 2006).

Figure 2 – Tirole and Rochet articles' frontispiece

Despite the title resemblance to some sort of 'state-of-the-art-document', the article displayed new insights regarding the subject. It presents a more detailed and refined definition of two-sided markets[9]; details conditions to the formation of two-sided markets (*e.g.*, the existence of transaction costs among end-users); and finally, it consolidates knowledge on the topic since the author's 2003 publication. All these elements are present in the first (2004) and in the final version (2006) of the article. Still, one topic was present in the first version, but did not make it to the final publication: the role of digital platforms as regulators. The authors point to this regulatory role, when platforms decide over matters that escape the economic field and enter in other domains: "Platforms must perform the balancing act between the two sides along various policy dimensions and not only with respect to the price structure." (ROCHET; TIROLE, 2004, p.40, emphasis added). This meant that, in a regular basis, platforms took on the role of: price regulation authority, licensing authority and competition authority (ROCHET; TIROLE, 2004).

Regulatory issues are part of the economic métier. In light of that, the decision to omit the topic of regulation from the final version of the article may have been only a question of form. The major contribution of the article did not touch on this subject and it appeared only as additional observations by the authors. Furthermore, they may have decided to wait for the maturity of knowledge on regulation of digital platforms to mature in order to express any opinion on the subject. Another hypothesis is that Tirole and Rochet realized, from that moment, that the supra-economic activities conducted by the platforms would require going beyond the mere review of competition policy. They may have realized that "From an institutional logics perspective, then, a platform unites functions previously distributed among the institutional logics of the corporation, the market, the profession and the state in a single organizational form" (FRENKEN *et al.*, 2020). Platforms present such a disruptive organizational logic that it would require going beyond mainstream economics to fully understand it and, specially, act upon it. It would require the perspective of political economy.

4. The Political Economy of Digital Platforms

Platforms, in association with artificial intelligence algorithms and widespread digitization, constitute the core of the digital technological system. This technological system is responsible for the diffusion of the digital technologies in formation since the 1970's. By democratizing these technologies and eliminating bottlenecks, the digital technological system enabled the right conditions for the consolidation of digital platforms as a firm model. However, technology is a necessary but not sufficient condition. It was necessary to put in place a political and institutional environment conducive to the practices, rules and alliances that revolve around the platform as a model. Platforms reinforced pre-existing trends in terms of labor relations, relying on independent contractors. However, they changed the logic of investment: while the standard firm model in the late twentieth century sought to maximize

[9] "A market is two-sided if the platform can affect the volume of transactions by charging more to one side of the market and reducing the price paid by the other side by an equal amount." (ROCHET; TIROLE, 2004, p. 40).

shareholder value in the short term, platforms play the game in the long run. They seek domination of markets through network effects, which incurs the acceptance of financial losses for some (or many) years. Alliances with social groups have also shown changes: the platforms strengthen contact with consumers, who become tenacious stakeholders in the defense of this firm model (RAHMAN; THELEN, 2019).

These changes attracted a lot of attention (and, mostly, criticism) from different social sciences perspectives, such as critical studies of media, social studies of science and technology and political economy. We focus on the latter, to complement our picture of the evolution of economic analysis. Political economy is a broad field, with diverse research traditions. There has been a general movement to mobilize traditional analytical tools to interpret digital platforms and their associated developments. Montalban, Frigant and Jullien (2019), for example, analyze the regulation mode and the institutional forms of the platform economy based on the *École de Regulation*. They conclude that the platform economy is a continuation of the financialized accumulation regime with slight modifications. Marxist researchers have interpreted the implications of the platform economy on topics such as work, appropriation of value, rentism and the new enclosure of knowledge and data commons. It is possible to identify two major currents of research within Marxism. The first, more orthodox, identifies how platform work is just the end of a long chain of labor exploitation. The second debates automation from the point of view of post-Fordism, actively seeking new techno socialist forms (GONZALES, 2020). Given the impossibility of dealing with all these currents, we focus on two of the most promising streams of research. They do not necessarily comprise a 'school of thought', but they share similar perspectives and theoretical references.

4.1 Public Value

The most important work on platforms and public value is *The Platform Society* (VAN DIJCK; POELL; DE WAAL, 2018). They conceptualize platforms in three levels: sectoral platforms (such as transportation or education), infrastructural platforms (such as google search, that provides essential services to the majority of other actors) and ecosystems of platforms (national or regional interrelated sets of sectoral/infra platforms). Their analysis, however, is directed to the first two levels, and almost no attention is given to ecosystems of platforms. There are many qualities in their analysis: deriving categories (sectoral, infrastructural) from empirical data, organizing empirical data regarding four sectors (news, urban transport, healthcare and education), aptly demonstrating the problematic relation between infrastructural and sectoral platforms, and describing the main mechanisms digital platforms operate: datafication, commoditization and selection.

The Dutch researchers point to the regulatory role undertaken by platforms. The problem, they argue, is that digital platforms have become infrastructures of economic and non-economic transactions, and as such, they should operate in line with public values and cater to the public good. "The questions whose interests a platform's activities serves, which values are at stake, and who benefits are central in disputes concerning the creation of public value in the platform society." (VAN DIJCK; POELL; DE WAAL, 2018, p. 25). This inquiry regarding public value is based on Mark Moore's and Barry Bozeman' works on public value creation (GELDERBLOM, 2019).

Researchers following this line of thought do not deny that digital platforms are innovative business, nor that they generate value. Their worries concentrate in the unilateral appropriation of the generated value, usually backed by neoliberal ideologies. There are two important points in their perspective that lacks appropriate treatment: first, what is the definition of the 'common good', or at least what are 'common good' main concurrent versions; second, from which standpoint does the narrative contained in *The Platform Society* makes sense? While the first point is debatable, the second one is a serious lack of transparency in the Dutch approach. One can infer from the content of their books and articles that they sustain measures to re-orient digital platforms activities and goals from a social-liberal point-of-view (GELDERBLOM, 2019), since they seek participation of civil society and of the state in the platform economy in equal footing with market forces.

In the end, regarding a balanced version of the platform economy, they "will argue that supranational, national and local governments have a special responsibility in this regard" (VAN DIJCK; POELL; DE WAAL, 2018, p.6). They look forward to a proactive state in regulations, but not just in traditional competition policy, since price is hardly of any help to the regulator when some products/services are 'free'. In place of that, they argue it would be necessary to "reframe platform

power by expanding the notions of consumers, companies, and markets to include broader notions of citizen wellbeing, an integral platform ecosystem, and societal infrastructure." (VAN DIJCK; NIEBORG; POELL, 2019, p. 12). They also look forward to government as developer and user of digital platforms. In a more recent article, van Dijck has actively called for a more variegated platform ecosystem in Europe, including public and NGO's platforms (VAN DIJCK, 2020).

To sum up, public value approach sees in the mix of (i) digital regulation and (ii) broader participation as the solution to many of the problems elicited by the accumulation of power in the hands of a few commercial platforms. It relies heavily in empirical work, based on a diversity of methods such as ethnography, nethnography, and thorough case studies. While this analytical profile allows one to obtain a fine-grained picture of digital platforms behavior, it is criticized since its findings are not generalizable, since the research conducted regarding public values in the European context has little connection to the reality of Asian digital platforms (or elsewhere).

4.2 Institutionalism

While public value scholars focus in the role of modernizing the State regulatory apparatus, institutionalists go a step further: they believe it is necessary to restructure all (or most of all) the major economic and social institutions of society. They argue so because they interpret current transformations through the lens of Karl Polanyi's masterpiece, *The Great Transformation*. Therefore, when we refer to institutionalists we are referring to a group under strong influence of Polanyi's ideas. We could sum up this influence in two broad points: (i) the process of commodification and (ii) society's double movement. Karl Polanyi argued that the industrial revolution was a moment of institutional innovation. Society imputed new meanings to pre-existing elements, in this process creating what the author called 'fictitious commodities': mainly land, labor and money. Society reframed these elements, (in this process, relegating its intrinsic value to the background) in terms of market commodities: stripped down of their original meaning and function, and elevated as a tradable good just as any other manufactured item. The same thing is taking place in the digital economy. We need to be careful not to hastily claim that the fictional commodity of the moment is data. In fact, data substantiate the true commoditization: "within the digital economy, all communicative actions be regarded as social transactions embedded within an economy of integrated markets" (ATHIQUE, 2019, p. 19; PALUMBO, 2020).

This process of commodification did not emerged naturally, but was fostered by science (network science), technology (the complementary needs of digital technology) and the government (specially its neoliberal ideology) (GRABHER; KÖNIG, 2020; PALUMBO, 2020). A synthetic and strong form to put the process of commodification stresses that it is "marked by taking things that live outside the market sphere and declaring their new life as market commodities" (ZUBOFF, 2019). As a reaction to this unrealistic disembedded market, society responds with a reabsorption of the sphere of exchanges. This happens through the reconstruction of its most important institutions, such as labor legislation, social security, intellectual rights protection and so on. This reaction is the way for society to avoid anomie in the face of the growing erosion of social protection and anachronism of labor legislation (CHEN *et al.*, 2020), among other institutional systems of social control over the economic order. The question then becomes which social groups will initiate this countermovement and what is going to be their masterplan to create a digital edition of the welfare state (CHEN *et al.*, 2020). Like the author who inspired this trend, institutional studies use historical analysis as an instrument. Although this allows the perception of large general movements, it can fall into a false analogy between different phenomena.

A stream of research closely related to this is that of legal institutionalism (DEAKIN *et al.*, 2017; HODGSON, 2015). These authors note the link between political economy and law. As we go through this broad social transformation, it is exposed that economic relations do not occur in a primordial institutional vacuum, but are actually the product of an objective legal order: "As law evolved to create more property or property- like protection for information, information became an increasingly viable and valuable form of capital." (KAPCZYNSKI, 2020, p. 1487-88). The richest account of how law co-evolved with technology under the neoliberal ideology influence is in Julia Cohen's *Between Truth and Power: The Legal Constructions of Informational Capitalism*. The author exposes the power position of information platforms, as nodes in the network of informational capitalism, and how they were privileged in different juridical acts (*e.g.*, first amendment used as justification to declare that platforms are not imputable of restricting speech in their domains) (COHEN, 2019). In general, Cohen teases out

"the connections between platform logics and the emergent design of informational property institutions" (COHEN, 2019, p. 37). This not only overturns any type of defense of the naturalness of the market (as well as its independence from the State, guarantor of the law), but it also lays bare the non-neutral role of platforms in the economy and in society. The most interesting point about legal institutionalism is its analytical perspective. At the same time that the institutional point of view allows a broad view of the changes underway, the use of norms and laws contextualizes the analysis in space and time, preventing the researcher from falling into the trap of simple historical recurrence.

5. Discussion

In 2009, Annabelle Gawer organized the book *Platforms, Markets and Innovation*. It was the first book to put together a host of scholars to think about the new role platforms were undertaking in the economy. In the occasion, she mentioned, "with platforms, we are facing a situation where existing theory is reaching its limits." (GAWER, 2009, p. 3). This paper addressed the progress in economic analysis in terms of theories, methods and frameworks for the investigation of digital platforms. It was possible to carry out an initial mapping of both orthodox and heterodox economic approaches, as well as the implications for political economy analyzes.

We saw how the neoclassical microeconomic theory absorbed digital platforms without much noise. Its assumptions made possible the establishment of a model that served as the basis for a new current of studies in industrial organization. We have also seen that alternative economic theories, such as the transaction costs theory, are under pressure by the changes promoted by digital platforms. These changes have sparked an interesting debate about the nature of the firm, organizational forms, markets and networks. Still, more research is necessary to understand how these changes will affect each theoretical tradition. With regard to political economy, we find several attempts to fit the new phenomena into old vessels. There is a multiplicity of Marxist, Polanyian, regulatory studies, etc., mobilizing classical analytical instruments for a new and *sui generis* problem. These studies have brought important insights, allowing us to separate brand new and reissued phenomena. However, we seem to be facing a moment that calls for new approaches. Political economy has not yet fully understood the role of data imbricated with digital platforms, its attribution, management, ownership, possibilities, extensions, etc.

We base our conjectures on privately owned digital platforms literature, *i.e.*, which explore only one among many property configuration alternatives. It should be clear by now that platforms are not just a new model of firms, but also a new paradigm of economic organization (PEREZ, 2002); this fact has a direct relation to the gaps in this paper: we did not presented a review of the (growing) literature on cooperative platforms. Also, absent from this paper is the issue of platform work, an expanding universe of research that has different perspectives and analytical instruments on its own. Other important areas are absent from this article not because we choose, but because they are still largely underdeveloped. In particular, we mention the study of public digital platforms. There is no systematic study on the rationality of platforms developed by the public sector. If the vision of a more balanced platform economy depends on the existence of a variegated ecosystem of platforms (VAN DIJCK, 2020), public platforms based on democratic governance, universal accessibility and interoperability are a pressing issue. Another area lacking a critical mass of studies is digital platforms and development.

Manuel Castells mentioned in 1996 that our analytical categories were out of step with reality. Although we have advanced since that observation, the economy and society have also advanced. Still, the research community does not appear to be running out of energy.

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Economic analysis and digital platforms

Abstract: The co-evolution of technology and institutions, such as organizational models, sometimes accelerates and creates a gap between economic phenomena and the ability of scholars to analyze them. The development of the platform economy in the last few decades seems to be one of these moments. In this article, we discuss how economic analysis has responded to the techno-economic transformation that accompanies digital platforms. We present a critical overview of digital platform economics and political economy. Each area of study has responded in a different way to the advent of platforms. Mainstream microeconomics has developed new market models in specific sub-areas, without major difficulties. Alternative microeconomic theories (e.g., transaction cost theory) see their theoretical constructs affected by digital transformation. Currents of management and business have merged with studies of information systems in a large heterogeneous set of new and fruitful approaches. Finally, political economy has sought to accommodate new phenomena in old interpretive matrices.

Keywords: *digital platforms; digital economy; digital political economy; history of economic thought; methods*

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