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Regulation of transportation network companies and urban public policies[1]

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Abstract

Objective: To investigate the hypothesis that there are legal, economic, and socio-environmental justifications for the densification of urban regulation on transportation network companies (TNCs) in Brazil and analyze parameters that contribute to its formulation.

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Methodology: Using the multidisciplinary approach “law and public policies”, developed by Bucci (2013 and 2017), Bucci & Coutinho (2017), Ribeiro (2019) and others, we articulate theoretical concepts of Public Law and elements of empirical research in economics and urbanism focus on the relationship between TNCs and cities, in order to investigate justifications and possibilities for the urban regulation of this activity in Brazil.

Originality: Based on the test of the stated hypothesis, it is argued that the economic exploitation promoted by TNCs represents a new type of street use, the impacts of which demand the discussion of the deepening of urban regulation.

Results: Using the methods of analysis of the law and public policy approach, aspects of the public goods exploitation regime and the results of empirical research into externalities of the TNCs activity were assessed, identifying justifications for deepening their urban regulation. Decree no. 56.981/2016 of the Municipality of São Paulo, analyzed considering its effects under the criterion of effectiveness (Salinas, 2013; Ribeiro 2021; 2010a; 2010b), placed this dimension at the center of its intervention and offers useful parameters for the deepening of urban content rules.

Contribution: The nature and impacts of TNCs demand a deeper debate on their urban regulation, to conform the activity with urban policy objectives established in the Brazilian order.

Keywords: urban regulation and public policies, transportation network companies, urban streets, Decree no. 56,981/2016 of São Paulo

Regulação dos aplicativos de transporte individual privado de passageiros e políticas públicas urbanísticas

Resumo

Objetivo: Investigar a hipótese de que existem justificativas jurídicas, econômicas e socioambientais para o adensamento da regulação urbanística dos aplicativos de transporte individual privado de passageiros no Brasil e analisar parâmetros que contribuam para sua formulação.

Metodologia: Abordagem multidisciplinar de direito e políticas públicas desenvolvida por Bucci (2013 e 2017), Bucci e Coutinho (2017), Ribeiro (2019) e outros, articulando conceitos teóricos de Direito do Estado e de Direito Econômico e elementos de pesquisas empíricas voltadas à relação entre aplicativos de transporte individual privado de passageiros e o meio urbano, com o intuito de dirigir uma visão prospectiva às justificativas e às possibilidades de regulação urbanística dessa atividade econômica no Brasil.

Originalidade: A partir do teste da hipótese enunciada, argumenta-se de que a exploração econômica promovida pelos aplicativos de transporte individual privado de passageiros representa novo tipo de uso da via urbana, cujos impactos ensejam a formulação de parâmetros próprios de regulação urbanística.

Resultados: A partir dos métodos de análise da abordagem Direito e Políticas Públicas, foram analisados aspectos do regime de exploração dos bens públicos e resultados de pesquisas empíricas sobre as externalidades da atividade dos aplicativos, identificando-se justificativas para o aprofundamento e adensamento de sua regulação urbanística. O Decreto n.º 56.981/2016 do Município de São Paulo, analisado à luz de seus efeitos sob o critério da efetividade (Salinas, 2013; Ribeiro 2021; 2010a; 2010b), colocou essa dimensão no centro de sua intervenção e oferece parâmetros úteis à formulação de regras de conteúdo urbanístico de maior abrangência e densidade normativa.

Contribuição: A natureza e os impactos da atividade das empresas que operam aplicativos de transporte individual privado de passageiros demandam o aprofundamento do debate sobre sua regulação urbanística, de modo a conformar a atividade à luz dos objetivos da política urbana positivados no ordenamento jurídico brasileiro.

Palavras-chave: regulação urbanística, aplicativos de transporte individual privado de passageiros, vias urbanas, Decreto n.º 56.981/2016 do município de São Paulo

Regulación de plataformas de transporte individual privado de pasajeros y políticas urbanas

Resumen

Objetivo: Investigar la hipótesis de que existen justificaciones jurídicas, económicas y socioambientales para aumentar la regulación urbanística de las plataformas de transporte individual privado de pasajeros en Brasil y analizar parámetros que contribuyen a su formulación.

Metodología: Abordaje multidisciplinario de derecho y las políticas públicas, desarrollado por Bucci (2013 y 2017), Bucci y Coutinho (2017), Ribeiro (2019) y otros, articulando conceptos teóricos del Derecho del Estado y del Derecho Económico y elementos de investigación empírica en economía y urbanismo centrados en la relación entre las plataformas de transporte privado individual de pasajeros y el ambiente urbano, con el objetivo de dirigir una mirada prospectiva a las justificaciones y posibilidades de regulación urbanística dista actividad económica en Brasil.

Originalidad: A partir de la prueba de la hipótesis planteada, se argumenta que la explotación económica promovida por las plataformas de movilidad basadas en el uso intensivo de infraestructura pública representa un nuevo tipo de uso de la calle y da lugar a nuevos parámetros de regulación urbanística.

Resultados: Utilizando los métodos de análisis del enfoque de Derecho y Políticas Públicas, se analizaron aspectos del régimen de explotación de bienes públicos, así como los resultados de investigaciones empíricas sobre las externalidades de las plataformas, identificando justificaciones para profundizar y densificar su regulación urbana. El Decreto n.º 56.981/2016 del Municipio de São Paulo, analizado a la luz de sus efectos bajo el criterio de la efectividad (Salinas, 2013; Ribeiro 2021; 2010a; 2010b) colocó esta dimensión en el centro de su intervención y ofrece parámetros útiles para la profundización de las normas de contenido urbano.

Contribución: La naturaleza y los impactos del transporte individual privado de pasajeros mediante aplicaciones exigen un debate más profundo sobre su regulación urbanística, para conformar la actividad a la luz de los objetivos de política urbana establecidos en el ordenamiento brasileño.

Palabras clave: regulación y políticas urbanas, plataformas de transporte individual privado de pasajeros, calles, Decreto n.º 56.981/2016 de São Paulo

1 Introduction

About a decade after their emergence, Transportation Network Companies (TNCs) facilitating individual private passenger transport services have firmly established themselves as part of the reality in the Brazilian metropolitan regions.[2] Representing a notable example of the sharing economy (Sundararajan, 2016, p. 10), driven by technological advancements, widespread use of mobile devices, and resulting shifts in behavior on both the supply and demand sides, TNCs are linked to various socioeconomic transformations. These include the creation of new employment opportunities that have become a significant income source for hundreds of thousands of workers[3]; the diversification of transportation options; the emergence of new markets; increased competition in existing segments; and diverse impacts on urban mobility.

The sector quickly became embroiled in legal disputes. Initially, the focus was on the legality of app-based services, epitomized by the duality between TNCs' drivers and traditional taxi drivers. This conflict between different interest groups, which manifested on the streets of major Brazilian cities, transitioned into the decision-making arenas of all three branches of government at both local and federal levels (Zanatta & Kira, 2018). This contentious landscape persisted until legislative reforms sanctioned by the National

[2]Teixeira and Paraizo (2020) systematized and classified dozens of digital platforms for urban passenger mobility (excluding applications related to the transport of goods) into four categories: (i) mobility orientation, which includes platforms that act in locomotion orientation, such as Waze and Google Maps; (ii) on-demand transport, a category that encompasses applications that directly and instantly connect passengers and drivers, intermediating passenger transport services, including public individual transport (taxi), private individual and collective transport (such as Buser); (iii) vehicle sharing, relating to platforms that allow the sharing of cars, motorcycles, bicycles and scooters within a given urban perimeter; and (iv) ride sharing, comprised by paid ride-sharing applications, typically in private vehicles. The present study focuses only on one of the subtypes of platforms classified in the second category, namely, those that intermediate the on-demand transportation of passengers in private application vehicles, such as Uber and 99. In the English-language literature and, especially , in the regulatory debate in the United States, companies that operate such applications are called *Transportation Network Companies – TNCs* (Diao *et al*., 2021; Erhardt *et al*., 2019; Ngo, 2015 and others) , also receiving other nicknames, such as *ridesharing, ridehailing* or *ridesourcing* . As an example, in a search carried out on February 3, 2024 on the Google Scholar platform, using the term *tranpostation network companies* in quotation marks, 5,940 works were found.

[3]The Institute for Advanced Economic Research - IPEA estimated that, at the end of 2021, more than 900,000 active workers worked as app drivers in Brazil. Material information from 05/10/2022, available on the IPEA portal: https://www.ipea.gov.br/portal/categorias/45-todas-as-noticias/noticias/12169-1-5-milhao-de- delivery-men-and-drivers-were-in-the-gig-economy-at-the-end-of-2021 (Accessed on 20.08.2023).

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Congress under Law 12,587/2012 (National Urban Mobility Policy or "PNMU")[4] and rulings by the Federal Supreme Court (STF)[5] validated the legality of TNCs services. As elaborated in prior studies (Haddad *et al*., 2023), regulatory debates have progressed in areas such as competition, labor rights, and consumer protection.

During the period when the debate unfolded at the local level, there was a notable mobilization by the involved parties, who put forth arguments of a competitive nature. These arguments were rooted in claims of regulatory imbalances, predatory pricing, and other facets of the contention between fleet owners, traditional taxi services, license holders, and taxi drivers on one side, and rental companies, TNCs, and private drivers associated with the platforms on the other (Haddad, 2022). After a few years, considerations regarding market structure and practices came under scrutiny by the Administrative Council for Economic Defense (CADE). In 2015, student associations of two universities lodged a complaint with CADE against taxi unions, alleging the use of unfair methods to impede Uber's market entry, suggesting a potential anti-competitive abuse of the right to petition. The case was closed in 2018 by the CADE Tribunal[6], the same year that its Department of Economic Studies (DEE) published a study on the competitive implications of Uber's foray into the taxi app market (Brasil, 2018).[7]

In the realm of employment, alongside academic discourse on the evolving labor relations associated with the digitization of the economy (often dubbed as 'uberization'), rulings by the Labor Court regarding the rights of app-based drivers (and delivery workers) came into focus, particularly in assessing the criteria for establishing an employment relationship between workers and platforms. This debate escalated to the higher courts, which have yet to reach a consensus on the matter. Since 2020, panels within the Superior

[4] In a context of political clashes and pressure from multiple interest groups, the Brazilian Congress approved Law 13,640/2018, incorporating the modality of private individual passenger transport via app into the PNMU and contributing to the debate over its legality being overcome.

[5] Two cases worth mentioning that had as their object the debate on the legality of TNCs and were considered by the STF: ADPF no. 44, which questioned municipal law approved in the municipality of Fortaleza/CE; and RE No. 1054110, authored by the São Paulo City Council, which questioned the declaration of illegality of the applications by the Court of Justice of the State of São Paulo.

[6] This is Administrative Case No. 08700.006964/2015-71, judged by the Cade Tribunal on 07/04/2018, in which it was unanimously decided to close the case.

[7] In 2015, DEE itself had already carried out a similar study on the sector.

Labor Court ("TST") have issued conflicting judgments, prompting the matter to be referred to Subsection I Specialized in Individual Disputes, tasked with harmonizing jurisprudence. Concurrently, bills proposed in the National Congress aim to regulate this employment dynamic, proposing an intermediary framework that provides enhanced labor and social security safeguards for these workers without equating them with formal employees.[8] In June 2023, the Ministry of Labor established a dedicated working group with the objective of drafting labor regulations applicable to the sector.[9]

TNCs are also a focal point of regulatory discourse in the consumer domain. Administrative and judicial deliberations center on issues such as the delineation of the objective and joint liability of platforms for various types of harm that may occur to consumers and drivers. This discourse spans from incidents of harassment and violence to data breaches affecting information submitted by users through the applications. Some municipal initiatives have endeavored to set minimum standards for service quality to safeguard consumers.

While numerous legal and institutional issues remain unresolved, the conversation regarding the regulation of TNCs services has been gaining traction in Brazil across these domains (Haddad *et al*., 2023). Conversely, following the resolution of the dispute regarding the legality of TNCs, the urban dimension of their regulation has waned in public discourse and, to some degree, within decision-making bodies at the municipal level.

Building upon these observations, this study aims to explore the notion that there exist legal, economic, and socio-environmental rationales warranting a more in-depth discussion and improved urban regulation of TNCs services. Leveraging a novel application of the law and public policy framework – as expounded by Bucci (2013 and 2017), Bucci & Coutinho (2017), Ribeiro (2019), among others – to the analysis of issues pertaining to urban policy (Haddad, 2019), we endeavor to integrate theoretical and empirical components from

[8]As an illustration, we can mention Complementary Bill 180, of 2020, authored by deputies Reginaldo Lopes (PT/MG), Marília Arraes (PT/PE), Bira do Pindaré (PSB/MA) and Zeca Dirceu (PT /PR), which aims to guarantee drivers and app delivery people the right to a special retirement after twenty years of activity.

[9]Information disclosed on official channels in the Federal Government, according to the article dated 06/05/2023, available at: https://www.gov.br/trabalho-e-emprego/pt-br/noticias-e-conteudo/2023/junho/grupo -job-seeking-work-regulation-by-application-and-installed-in-brasilia (Accessed on 21.08.2023)

a prospective and partly prescriptive standpoint (Gaspardo, 2018). The objective is to ascertain whether, and to what degree, the activities facilitated by TNCs applications represent a novel form of using public urban space, the nature and extent of which yield socio-environmental impacts on the surroundings and urban populace necessitating more comprehensive urban regulation. Ultimately, we discuss parameters that, if the hypothesis is substantiated, should be considered in forthcoming initiatives aimed at reinforcing urban regulation.

As elaborated in Haddad (2019) drawing on methodological frameworks articulated by Bucci (2013 and 2017) and Bucci and Coutinho (2017), the law and public policy approach incorporates essential premises and strategies for examining urban policy: (i) a focus on understanding the application of law through the examination of intricate institutional arrangements; (ii) consideration of scale-related issues and an emphasis on the role of the Executive Branch as a central player in shaping public policies within the Brazilian institutional landscape; (iii) acknowledgment of the transversal procedural aspect of public policies, encompassing regulatory standards; and (iv) an active stance that envisions to identify legal remedies to enhance public policy outcomes. Building on this framework (Haddad, 2019), urban policy exhibits distinctive traits that render it a conducive domain for applying this approach: (a) an emphasis on upholding social rights; (b) a multidisciplinary nature; (c) reliance on the operation of complex institutional arrangements and the interpretation of norms from diverse legal realms; and (d) intrinsic distributive conflicts rooted in the disparities between the actual city and the legal city (Rolnik, 1999) and legal hurdles that impede the execution of progressive regulations (Maricato, 2011). Additionally, Ribeiro (2019) posits that within the law and public policy framework, constructing and empirically testing hypotheses are most effectively done through what are termed “Middle Range Theories” (Merton, 1968).

In alignment with the methodological tenets of this approach, this study advocates for a multidisciplinary endeavor that integrates concepts from State Law and Economic Law with empirical evidence derived from applied scientific research, amalgamating interpretative and

normative analyses, reviewing quantitative studies, and conducting economic assessments of markets. Notably, the discourse on urban regulation parameters employs a methodological foundation of legislative analysis founded on the criterion of effectiveness (Salinas, 2013; Ribeiro 2021; 2010a; 2010b) and focuses on a specific case deemed paradigmatic, being the foremost and most comprehensive urban regulation initiative regarding TNCs nationally, having been enforced in the largest city for over seven years.

The manuscript comprises four sections, aside from this introduction. Commencing with an exploration of the legal framework governing public goods, the subsequent section delves into examining whether TNCs have engendered a novel utilization of urban thoroughfares, warranting, from a legal perspective, bespoke urban regulation. Subsequently, an analysis of the externalities stemming from this activity is presented, appraising outcomes documented in empirical research and deliberating on whether these findings present economic and socio-environmental grounds necessitating urban regulation of the activity. The third section scrutinizes the characteristics of the markets evolving from the rise of TNCs, revisiting the regulatory challenges and principles delineated in Haddad *et al*. (2023). Lastly, the parameters for urban regulation are dissected based on a legislative scrutiny of Decree no. 56,981/2016 enacted by the Municipality of São Paulo.

1 The new type of street use propelled by TNCs

The Brazilian Civil Code (CCB) categorizes public goods into three classifications based on their utilization. *Goods for common use* are intended for activities characterized by generality, impersonality, and unconditionality, such as squares, beaches, and rivers (Grau, 1985, p. 52); *special use goods* are marked by an instrumental character, allocated for uses aimed at equipping government activities to meet collective needs (such as schools and hospitals); while *dominion goods* are delineated by exclusionary criteria, not specifically serving common or special purposes, nor directly fulfilling a public function. As delineated in the illustrative list in article 99, I of the CCB, streets constitute assets for common use.

However, the civil classification exhibits limitations when juxtaposed with the characteristics of streets. Notably, it is common in practice and recognized in scholarly

pieces that an asset can cater to multiple uses, which are compatible materially or temporally. The multiplicity of uses of public goods is not merely an option but a requisite for societal order (Medauar, 2018, p. 248; Marques Neto, 2009, p. 287). Therefore, categorizing a good solely based on its use appears less fitting than classifying the potential uses that could be attributed to a public good — ones not inherently or naturally predetermined, subject to political decisions. Even when viewed as a taxonomy of uses, the CCB classification seems confined since it aggregates vastly different uses under just three categories, failing to serve as a robust tool for comprehending the legal and factual reality in question.

By deploying five distinct criteria – conditions for use, level of rivalry, purpose, profitability, and temporality – the author classifies public goods into seven categories: (i) unrestricted use, open to any administrator, with substantial liberty and devoid of prerequisites; (ii) general use, accessible to all without necessitating an exclusive title but requiring compliance with a general and abstract requirement by the administrator; (iii) specific administrative use, marked by subjective conditions and an exclusive title granted solely to state agents or their delegates; (iv) specific utility use, also featuring subjective conditions and a specified title, directly enjoyed by the fulfilling administrator, distinguishing it from other types, either continually or occasionally; (v) economic use for public interest, where the asset supports economic activities broadly, serving a public service or utility; (vi) economic use for private interest, impacting the asset for economic pursuits that indirectly benefit the community, predominantly aiming for revenue generation; and (vii) exclusive non-economic use, a residual category entailing exclusivity without revenue generation.

This classification elucidates the diverse uses of streets, which can encompass at least five of these categories simultaneously. For instance, active modes of transportation (walking, cycling, etc.) and the right to assemble on sidewalks, squares, or even streets during demonstrations constitute unrestricted uses. Utilization of individual motorized vehicles by private individuals falls under general use, contingent on fulfilling specific conditions (such as possessing a driver's license). Conversely, a fixed law enforcement or

informational post, as well as the installation of electricity and telecommunication infrastructure, represent specific administrative uses; distinct from the specific utility use witnessed, for instance, at a subway station or bus shelters by commuters. The temporary use of a street for setting up a newsstand or hosting a street market exemplifies economic uses for public interest.

Thus, despite its primary focus on circulation, streets are subject to various uses that, while in harmony materially or temporally with circulation, are equally vital for the proper functioning of streets (Haddad, 2022). Building upon these foundations, the current inquiry delves into whether the utilization of streets facilitated by TNCs exhibits distinct nature and characteristics compared to pre-existing uses.

One of the pre-existing modes closest to the routes utilized by vehicles associated with TNCs is the conventional taxi service. Nevertheless, there are fundamental distinctions that surpass their divergent classifications within the PNMU itself, with the taxi service categorized as public individual transport (art. 4, IX) and the service rendered by private app drivers categorized as private individual passenger paid transport (art. 4, X). Despite not being categorized as a public service, the taxi service is deemed a public utility service, presenting key characteristics: it necessitates prior authorization, bears distinctive markings (such as color, plate, identification), is subjected to stringent regulatory rules and supervision, is open to the public, is conducted exclusively by members of a regulated profession, and is subject to public oversight concerning both supply (number of licenses issued) and pricing (taximeter fare). In essence, the local government determines the service quality, extent of services rendered, and the fee applicable for its usage.

In contrast, these criteria do not apply to private app vehicles, which engage in economic activities within the private sphere, operate within a competitive environment, typically involve any driver with a valid license, and focus on intensive utilization of streets to derive profits, predicated on pricing dictated by supply-demand dynamics. This does not constitute a public utility service but rather a private venture, although an argument can be made for its categorization as an economic use of general interest.

Moreover, the utilization of streets by private app vehicles stands apart from other economic uses, as it does not entail the partial closure of streets or temporary restrictions on their primary function. Instances like newsstands or licensed commercial activities exemplify situations where a portion of the street is cordoned off to facilitate permanent commercial installations at specific locations. Conversely, periodic street markets necessitate temporary restrictions on vehicle circulation, without requiring the complete suspension of traffic flow. Consequently, comparing these scenarios reveals that private app vehicles utilize streets in tandem with other general street users.

The groundbreaking aspect introduced by TNCs, catering to passengers or deliveries, lies in the proliferation of large-scale economic uses f of general interest, enabling revenue generation from intensive use of the streets (albeit not exclusive), without mandating relocation or brief curbs on their core purpose. Ultimately, this usage, in principle, aligns with the primary function of streets, yet it differs from the general use observed among other motorized transport users. As a partial response to the explored hypothesis, it becomes clear that the nature of urban streets utilization spurred by TNCs justifies the formulation of distinct urban planning regulations.

Due to these distinct attributes, albeit discreetly and to a certain extent covertly, the novel use of streets by TNCs vehicles can induce specific changes and externalities in the urban landscape. In an endeavor to delve deeper into this discourse, the subsequent two sections scrutinize the externalities stemming from TNCs' activities and the market characteristics they engender.

2 Externalities of TNCs' Activity on the Urban Environment

Initially, the operation of TNCs exploited regulatory grey areas. Reflecting on the U.S. scenario, Crespo (2015) correlates these gaps with attempts to extend traditional taxi regulations to these services. Given the significant legal distinctions between the two activities, it becomes pertinent to examine the potential externalities stemming from TNCs' platform operations in urban environments, further intensifying the scrutiny of the rationale for

bolstering urban regulations.

Early research on the effects of TNCs' activities was divided between studies focusing on theoretical benefits (e.g., SANTI et al., 2014 and VAZIFEH et al., 2018) and those striving to evaluate empirical impacts through interviews with drivers and passengers. While such studies yield varying outcomes, they fall short of providing comprehensive insights into the effects under consideration, as they center on specific cities and narrow aspects of the issue.

Through a systematic review encompassing 189 meticulously chosen articles, Khavarian-Harmsir *et al*. (2021) identified intricate, multifaceted, and occasionally conflicting outcomes arising from TNCs' activities. Noteworthy positive externalities highlighted by the authors encompass a spectrum of benefits: diversification of mobility options, augmented trip supply, reduced instances of drunk driving, bridging gaps in the transportation network, enhanced safety standards, operational efficiency gains, income generation opportunities, complementing public transport services, and alleviating congestion. Conversely, identified negative externalities include the concentration of benefits, regressive impacts on mobility conditions, spikes in accidents, weakened regulatory oversight, competition with public transport, heightened congestion and emission levels, fleet aging, and energy inefficiency.

Recent publications distinguished by methodological rigor and empirical design shed light on potential adverse externalities stemming from such activities. These studies underscore the significance of contextual disparities across various cities and urban zones in shaping effects, while also emphasizing avenues to mitigate negative externalities and amplify positive impacts through regulatory measures.

In a study by Diao *et al*. (2021), empirical tests using monthly congestion data (indicating travel time and hours spent in congestion) and public transport utilization (passenger numbers on public transport) across 44 metropolitan areas revealed a substantial surge in traffic levels following the commencement of TNCs in the surveyed regions. This uptick was attributed to both increased congestion intensity (by 0.9%) and prolonged congestion periods (4.5% longer). Concomitantly, a significant drop in total public transport

passengers was observed, indicating a detrimental substitution effect with an 8.9% reduction, escalating to 12% in the second year, and peaking at 16% by the third year.

These findings resonate with outcomes from studies honing in on specific urban locales. Erhardt et al. (2019) attributed a 62% spike in average vehicle transport delays in San Francisco from 2010 to 2016, surpassing the counterfactual scenario of a mere 22% growth in the absence of TNCs. Tarduno (2021) leveraged a natural experiment arising from the abrupt suspension of Uber and Lyft services in Austin, Texas, estimating an average daily traffic speed reduction of 2.3%, coupled with annual congestion costs ranging between 33 and 52 million dollars.

Barrios *et al*. (2023) linked the advent of TNCs with a 3% uptick in fatal accidents, impacting both vehicle occupants and pedestrians. The magnified negative ramifications tend to be more pronounced in cities with a higher prevalence of prior public transport usage, a trend that authors identify as persistent and, in certain instances, escalating over time. These accidents were associated with heightening kilometers driven on arterial roads and the surge in registered vehicles.

Furthermore, due to the intensive utilization of street networks, not always efficient, there are environmental repercussions stemming from TNCs' activities. Ward et al. (2021) simulated a scenario where private car usage is replaced with app-based cars, revealing an adverse environmental impact.

Drawing on a Brazil-based study utilizing data from the 2017-2018 Family Budget Survey, Warmar and Pereira (2022) identified socio-economic inequality and spatial concentration associated with TNCs' activities. The investigation unearthed that while the burdens of app activity are shared, its benefits tend to concentrate among privileged demographic segments, with higher usage rates observed among affluent, white populations with advanced education residing in better-equipped neighborhoods.

While the aforementioned research is not exhaustive, nor does it conclusively elucidate that the net effects of TNCs' activities are universally detrimental to the urban environment, the reviewed literature collectively underscores the diverse and contingent

impacts dependent on various external market factors. Simultaneously, the cited studies demonstrate that adverse economic and socio-environmental effects can tangibly arise from such activities, underscoring the imperative for regulatory intervention. Notably, five potential negative effects on the urban environment warrant attention: (i) fostering individual motorized transport and competing with public transport modes; (ii) deteriorating mobility conditions, leading to increased congestion frequency and duration; (iii) heightening traffic accidents; (iv) exacerbating pollutant emissions; and (v) exacerbating social inequalities, with benefits concentrating among select groups while the burdens are shared. The collective body of literature not only offers economic and socio-environmental justifications for bolstering TNCs regulations but also advocates for regulatory mechanisms to preempt or mitigate associated challenges.

3 Characteristics of Markets and Regulatory Challenges

The rise of TNCs has led to the emergence of new markets and sectors. This shift represents not just a mere increase in scale, but a qualitative overhaul in how transportation services are provided and consumed. Drawing on specialized literature in the field, this section seeks to delineate key attributes of these burgeoning markets. By distilling insights from Haddad *et al*. (2023), the regulatory impediments posed by these characteristics are underscored.

The TNCs' markets adhere to a two-sided market (2SM) framework.[10] While a universally accepted definition of 2SM does not exist (OECE, 2009), scholarly works and antitrust jurisprudence elucidate its operational dynamics. For instance, Cade's precedents have underscored that 2SM "*creates value by uniting two or more distinct economic agents, facilitating interactions among them*."[11]

Scholarly work converges on at least three essential facets of these markets (OECD, 2009). Firstly, such markets involve two or more discernible user groups with a degree of

[10]As noted by DEE/Cade in Working Document 001/2018 (CADE, 2018), “the architecture of sharing economy platforms follows the logic of two-sided markets (M2L) or multi-sided platforms ”, being that TNCs fall into the “more intensive use of durable goods” sharing category.

[11]SEI Document No. 0475654 in Administrative Process No. 08012.010483/2011-94.

interdependence, relying on the platform for intermediating interactions or transactions, thereby necessitating simultaneous service provision to these groups. Secondly, 2SM exhibits network externalities, where the platform's value for users on one side varies based on the number of users on the other side. Consequently, pricing disparities among different user types impact overall transaction volumes, with the platform's pricing framework exhibiting non-neutrality.

The operational nuances of 2SM were first expounded by Rochet and Tirole (2003), who contended that interdependence between user groups mandates intermediary compensation management. In the authors' view, owing to network effects, prices in these markets fluctuate not only in response to marginal costs but also considering the price elasticity of demand on each side, the additional value each new participant on one side contributes to participants on the other side, as well as the level of competition between competing platforms and within each group of users of the same platform.

This unfolds a specific type of positive externality, wherein the individual gains of each new user tend to be comparatively smaller, on average, than the collective gain derived from network expansion as a result of their membership. This promotes economies of scale, as network advantages tend to accrue in a greater extend than the rates of expansion of the user base, further exacerbated by the dilution of fixed maintenance and operational costs. This amalgamation of scale economies leads to the concept of critical mass, signifying the user threshold beyond which the platform experiences exponential growth or decline contingent on its trajectory (Economides & Himmelberg, 2014).

Oz Shy (2001) underscores two additional factors complementary to network externalities. Firstly, the relevance of compatibilities, complementarities, and standards in offering integrated products and services conducive to combined consumption. Secondly, considerations on the diffusion effects of a specific standard, highlighting the high costs linked to transitioning to an alternative standard that heighten the likelihood of consumer lock-in effects.

Most of these characteristics manifest in markets spawned by TNCs, characterized

by a penchant for high concentration, alongside a competitive landscape pivoting on innovation and differentiation beyond mere pricing factors. In Brazil, as in other regions, the initial entrant leveraged network effects to establish enduring dominance. The augmented user base on one side of the platform augments its capacity to attract users on the other side, engendering a feedback loop. The pioneering strides of Uber continue to reverberate in market dynamics: its sizable customer base bolsters driver attraction, fostering enhanced revenue generation potential while reducing vehicle arrival times, thereby attracting more passengers and fortifying pricing strategies and driver retention. Given the scalable nature, this process aligns with the concept of *tipping effects*.[12] The associated entry barriers are exemplified by instances of company exits from the market, including the symbolic withdrawal of Spanish firm Cabify from the Brazilian market in June 2021, thereby solidifying a duopoly comprising Uber and 99.

In essence, the markets stemming from TNCs emergence are structured as 2SM, marked by network externalities and scale economies, fostering a proclivity towards market concentration, imposing formidable barriers to entry, and entailing high consumer transition costs (Haddad *et. al*., 2023). Additionally, in customary market fashion, the pricing structure displays sensitivity as a mechanism to modulate supply and demand predicated on the interdependent relationship between drivers and passengers.

These attributes present general regulatory challenges, encompassing the urban facet of these activities governed by local authorities. The platform's heightened market concentration and dominance translate to a superior bargaining power vis-à-vis diverse user categories within the economic realm, enabling influence over regulatory direction and even exerting veto powers in policymaking spheres. This dominance shapes not only supply

[12] As pointed out by DEE/Cade in a review of specialized reports on competition in digital markets: "*Markets with such characteristics [digital platforms] tend to 'tipping', that is, at a certain moment, the confluence of these factors tends to quickly concentrate the market in a single ultra-dominant agent. Markets with 'tipping effects' typically feature intense market competition at the beginning, which then turns into a likely long period of low competition in which the winner/monopolist enjoys the rents of its market power. These rents are protected by high barriers to entry related to the network effects of the products offered (it is difficult to coordinate the mass migration of consumers), important economies of scale and scope (including those related to database control), customization of services offered and the growing competition for ecosystems. These barriers would make it difficult for competing products to expand, even technically superior ones. As data is obtained by companies as a derivative of their products, incumbents have a great advantage in obtaining it—something that protects their privileged position in the market. In fact, companies also design their complex ecosystems to increase their data collection capacity, again increasing barriers to entry and expansion for competitors and protecting their revenues.*" (BRASIL, 2020)

structures, pricing dynamics, and corporate strategic behavior but also impacts control over expansion pace, innovation trajectory, and sector evolution data that are pivotal for regulatory formulation and calibration. Ribeiro's work (2012, 2015) delving into banking and financial regulation examines potential contradictions between competition regulation and other regulatory spheres underscores their mutual reinforcement, rather than conflict. Given the potent economic and political influence wielded by entities under regulation[13], compounded by marked information asymmetry between governmental bodies and market entities, alongside the idiosyncrasies of price formation, navigating standardization and supervision of TNCs' activities poses great challenges.

4 Parameters for Urban Regulation: Case Study of Decree No. 56.981/2016 by the Municipality of São Paulo

Upon investigating the stated hypothesis, this article has discerned legal, economic, and socio-environmental rationales for enhancing urban planning regulations pertaining to TNCs. Consequently, this final section delves into the parameters for governing this activity, drawing on a non-exhaustive appraisal of the impacts of Decree No. 56,981/2016, issued by the City of São Paulo, assessed through the lens of effectiveness (Salinas, 2013; Ribeiro 2021; 2010a; 2010b).[14]

This marks the inaugural endeavor in locally regulating a TNCs' market in Brazil, in effect for over seven years, designating as its key focus the potential merits and burdens arising from the operations of companies denoted as "Technology Operators and Accredited Transport" (OTTCs) in the legislation. This approach is prominently articulated in the epigraph that underlines the regulation outlining "*the intensive use of streets for the pursuit of economic activities.*" The decree posits that this is not a general street usage scenario; rather, it signifies economic utilization, entailing the intensive deployment of street infrastructure for commercial gain.

[13] Ribeiro (2005) found empirical evidence of the relationship between the existence of agents with great economic power and the need for more formal procedural rules, showing the challenge posed to regulation in more unequal societies.

[14] The formulations in this regard adopt as a starting point the analysis undertaken in Haddad (2022).

The emphasis on regulating streets usage and its economic ramifications transpires through the principles delineated in Article 2 of the Decree, encompassing mandates such as "*preventing underutilization or overloading of available infrastructure*" (Art. 2, I), "*streamlining the utilization and occupation of available infrastructure*" (Art. 2, II), "*enhancing accessibility and mobility conditions*" (Art. 2, III), "*advancing the sustainable development of São Paulo in socio-economic and environmental dimensions*" (Art. 2, IV), and "*harmonizing with the promotion of public transport and alternative modes of transportation*" (Art. 2, VII), aligning with the National Urban Mobility Policy (PNMU) and constitutional tenets of urban policy. These directives underscore the recognition that this novel mode of transport is an integral part of broader street management and must adhere to regulations aimed at achieving explicitly defined public interests.

A primary instrument devised to realize these directives pertains to the notion of "*kilometer credits*," where the utilization thereof is contingent upon "*granting onerous access and payment of a public fee in exchange for the right to intensive street usage*" (Art. 8, §1). The determination of this public fee, per Article 11, factors in the urban and fiscal impacts of street usage on the environment, traffic flow dynamics, and municipal expenditures linked to urban infrastructure. Furthermore, the Decree stipulates that such a mechanism can incentivize socially and environmentally beneficial behaviors like ride-sharing (Arts. 7 and 12, I), balancing service provision across diverse regions and timeframes (Art. 12, II and III), intensifying the adoption of sustainable and accessible vehicles (Art. 12, IV, V, and VI), fostering integration between this and other transport modalities (Art. 12, VII), and ensuring female representation among registered drivers (Art. 16).

Implicit in these efforts is a diagnosis that unregulated scenarios could perpetuate and exacerbate preexisting inequalities and disparities within the market's functioning, aligning with extant literature findings. Affluent or central neighborhoods may witness an increased availability of rides compared to peripheral or less affluent regions; peak hours might receive preferential treatment at the expense of service availability during less congested periods, which coincide with limited alternatives in other transportation modes;

due to systemic disparities, women may face marginalization and underrepresentation among TNCs' drivers. Regulatory interventions aim to rectify these imbalances, deploying economic incentives to align supply behavior with social needs, catering not only to consumer interests but citizen welfare.

Equally significant is the mandate for data sharing between platforms and the Municipal administration. Article 4 delineates data that can be shared, encompassing trip origin and destination, duration, distance, route, vehicle arrival times at origins, price components, driver details, alongside other relevant data vital for market oversight, regulation, and mobility policy execution.[15] This initiative endeavors to bridge the information asymmetry prevalent between market actors and governmental bodies, furnishing tools for municipal agencies to requisition crucial data essential for market comprehension, monitoring, regulatory fine-tuning, and transportation planning.

An additional facet pertains to the establishment, as per Article 26, of the Municipal Road Utilization Committee (CMUV), an interdepartmental entity comprising administrative members tasked with defining the maximum tariff rates (Art. 13). This empowers the public authority to delineate a pricing range wherein rates can fluctuate based on market dynamics, albeit subject to economic incentives embedded in the regulatory framework. The CMUV wields supervisory and penalty powers, operating as the regulatory authority overseeing OTTCs. A comprehensive scrutiny of the CMUV by Zanatta & De Paula (2019) revealed that post-establishment, the committee's jurisdiction transcended TNCs' regulation, encompassing facets like carpooling and autonomous vehicles, underpinning an "*urban governance mentality*" that led to provisions extending beyond on-demand ride services, incorporating regulations applicable to services such as bike-sharing and vehicle parking that similarly leverage public circulation space for economic activity.

In a comparative analysis with the regulations of other cities around the world, the same authors identified three innovative aspects within the Decree's approach: (i) leveraging

[15]On the regulation of the duty of information and the conflicts surrounding its requirement, see Antonialli & Kira (2020).

market mechanisms to control activity externalities without distorting functionality; (ii) assimilating insights from regulatory experiments in other cosmopolitan hubs worldwide and integrating equity considerations; and (iii) adopting a perspective centered on public goods usage and accounting for socio-environmental activity externalities within urban settings (Zanatta & De Paula, 2019). The regulatory framework underscores a communal outlook and urban context of the activity, underpinned by an empowered governance structure and the provision of efficacious and adaptable tools to shape corporate conduct with a view towards public interest fulfillment, without unduly restricting core market variables.

Since the promulgation of the Decree, there has been a consolidation and expansion of markets of TNCs and other types of platforms. Particularly in the wake of the pandemic, delivery apps, for instance, have witnessed a a relevant increase. Despite that, deliberations on the urban regulatory aspect have receded. Hence, a reassertion of its centrality in regulatory discourse is warranted, considering the proliferation of economic utilization forms in public urban spaces facilitated by evolving technologies and consumption patterns.

5 Concluding Remarks

This article aimed to enrich the debate surrounding the urban regulation of TNCs. Despite the resolution of the legal controversies surrounding their operation, the urban perspective in Brazil has somewhat receded. Conversely, affirming the investigated hypothesis, an examination of the type of street utilization they facilitate and the potential urban externalities they may engender underscores the legal, economic, and socio-environmental rationales for augmenting their regulatory framework. To reignite this dialogue, we expound on the justifications, hurdles, and standards through three lenses: the nature of street utilization they promote, the economic and socio-environmental externalities they generate in urban settings, and the features of emerging markets.

In closing, we offer an exploratory discussion on key parameters to contemplate in the urban regulation of TNCs, drawing from the regulatory framework implemented in São Paulo in 2016. Conclusively, grounded on the operational tenets of 2SM and the intricacies of price formation, urban regulation pertaining to TNCs necessitates innovative strategies to

amplify potential benefits, such as optimizing automobile usage and complementing public transportation, and mitigating adverse externalities to the greatest extent possible — such as discouraging excessive reliance on individual motorized transport, curbing congestion, reducing pollutant emissions, and ameliorating regressive social impacts on mobility conditions.

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