Case Study Report

EFFECTS OF PLATFORM ECONOMIES ON INFORMAL SETTLEMENTS IN SÃO PAULO, BRAZIL

A data-based analysis on how Uber, Airbnb and Instagram affects urban dynamics in informal settlements

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Abstract

This paper investigates how urban platform economies effects relationships between non-informal and informal areas of São Paulo, Brazil. Following a theory on the functioning of global city formulated by M.Castells, this paper analyses urban digital economies as agents of the segregation process inherent to the contemporary global city. Starting from data on Uber, Airbnb and Instagram this research describes urban phenomena that affects processes of real estate investment, gentrification, development of public transport, use of public soil, eviction and expropriation. All these phenomena show a complex relation with informal areas, that are included in digital networks created by these platforms but often suffers all their negative aspects in the fields of public space and real estate. This analysis have been conducted with Qgis with the primary goal of mapping digital economies outputs (Uber rides, Airbnb listings, Instagram posts) and analyse these data to better understand how platform economies works in areas of high social vulnerability.

Keywords

Platform, economy, informal, data, urbanismo, inequality

1. Introduction: São Paulo as ground of study of platform economies in fragile territories

New technologies have changed mainstream living habits in big cities: digital platform economies are tools to get an accommodation, get goods, move, and structure social life in a city. Their functioning is shaped on the environment of global cities: they provide information for people who have to navigate a big urban environment they ignore and they rely on huge amounts of data from other users and presence of perfect internet coverage. São Paulo has been chosen as ground to this research due to the strong presence of informal settlements not only in peripherical areas but also close to the city centre. These areas have been generated by the process of construction of the global city and are an organic part of its environment (Castells 2001). In the age of modern infrastructural development, São Paulo and other major Brazilian cities grew at great speed. To sustain this rhythm constructions were made by low wage workers from rural areas (mainly from north-east of the country). These populations took little advantage

of the grand architectures they built, in fact often they could not even afford to live in the city they worked. They lived in temporary group of shacks that gradually became permanent favelas (Lloyd-Sherlock 1997). That is the case of major informal settlements of Brasilia and São Paulo. Division between non-informal and informal city is still visible in urban morphology today and still represents exclusion from the city's economic advantages. In São Paulo almost the 30% of the population lives in informal settlements (SMDU 2012). These areas are not circumscribed on the borders of the built environment but often are located near the centre. To map informal areas this work relies on a database by SEHAB (Secretaria Municipal de Habitação de São Paulo) which contains position and area information for all informal settlements in the city, which include nucleos (informal areas regularized with primary urbanization infrastructures) favelas (informal settlements) and corticos (squatted buildings). This paper mainly (where is not otherwise specified) considers all type of informal settlements as they share the same socioeconomic and aesthetic characteristics. That is why the main distinction in the analysis has been made between informal and non-informal areas of the city.

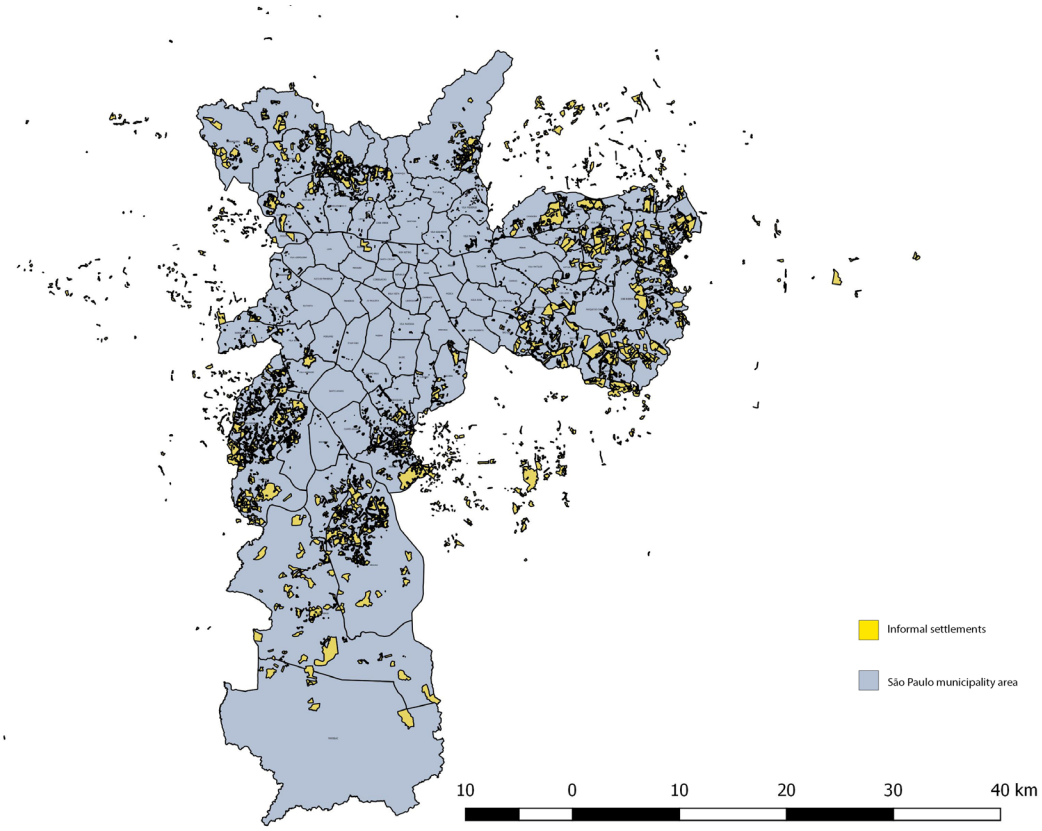

Figure 1. Map of Informal Settlements in São Paulo. Source: F.Godino

In the meanwhile, connections that gives global cities their position in global markets have accelerated. Digital platforms today allow global citizens to live, move, get all possible kind of goods, and even participate in social life of a city that they do not know. And even more important they constitute a network that exclude areas that are useless for a global citizen. It reinforces the perception of what is in and what is left outside the city. Even if, as we will underline, appropriation of new territories is a strong element of urban growth in global cities. São Paulo is the perfect case study to analyse how platform economies reinforces this division influencing informal settlements urbanization process.

This work considers digital interactions between non-informal and informal city from three points of view: transport, housing, and social networks. There is of course a variety of digital platforms that contributes to the contemporary way of living in Sao Paulo in these fields. The choice of analysing Uber, Airbnb and Instagram was made because of two factors: number of users and data availability. Uber is the most used carhiling app in the city (Rochabrun, 2019) and the only one that publishes its data, even in a very raw form (Uber Technologies, Inc.). Airbnb is the largest network for short term rent in the city of Sao Paulo: around 10000 houses are currently on the platform's listings. So, this is both the most representative platform for short term rent market and one of the few that we can study thanks to the open source work of Murray Cox that published Airbnb listings on its website Inside Airbnb. In the case of Instagram this is both one of the most used social networks in brazil and the only one that is entirely based on the use of images. The approach this analysis chose was to link the production of social media content to images that represented the urban area they are produced in. Instagram offered this possibility thanks to geo-localization metadata and a hashtag system that made easy to elaborate the huge amount of data obtained through the application API.

2. Platform mobility

2.1. Carhiling in São Paulo

São Paulo is the city with the highest number of uber rides in the world (Rochabrun, 2019). Carhiling apps found a perfect ground in a city that have historically predilected private car mobility on public transport. For some routes carhiling is even cheaper that public transport. This led a great amount of people operating as drivers. Many of them lives in favelas, and this let both to an increase of car loans and to a saturation of favela urban space with cars. In Paraisópolis favela, for example, urban voids are turning into parking lots for driver's cars (often rented). Even if the presence of favela drivers is relevant in São Paulo, the phenomena is hard to quantify given restricted access do uber drivers listings and the absence of reliable census of favelas. In addition to this there are numerous favelas thar are formally not included in the uber availability area, due to the risk of robbery to which drivers and passengers are exposed. Uber also introduce a problematic relation with public transport, complementing it in the wealthiest areas and competing with it in the poorest (Jin, Kong e Sui 2019). In cities with poor public transport infrastructure as São Paulo that leads to even less incentive to development of public transport sector. That phenomenon is even stronger considering that the divide between public and private transport users in Brazil partly reflects the divide between wealthy areas and ones of strong social vulnerability and therefore poorly represented interests in the construction of the city.

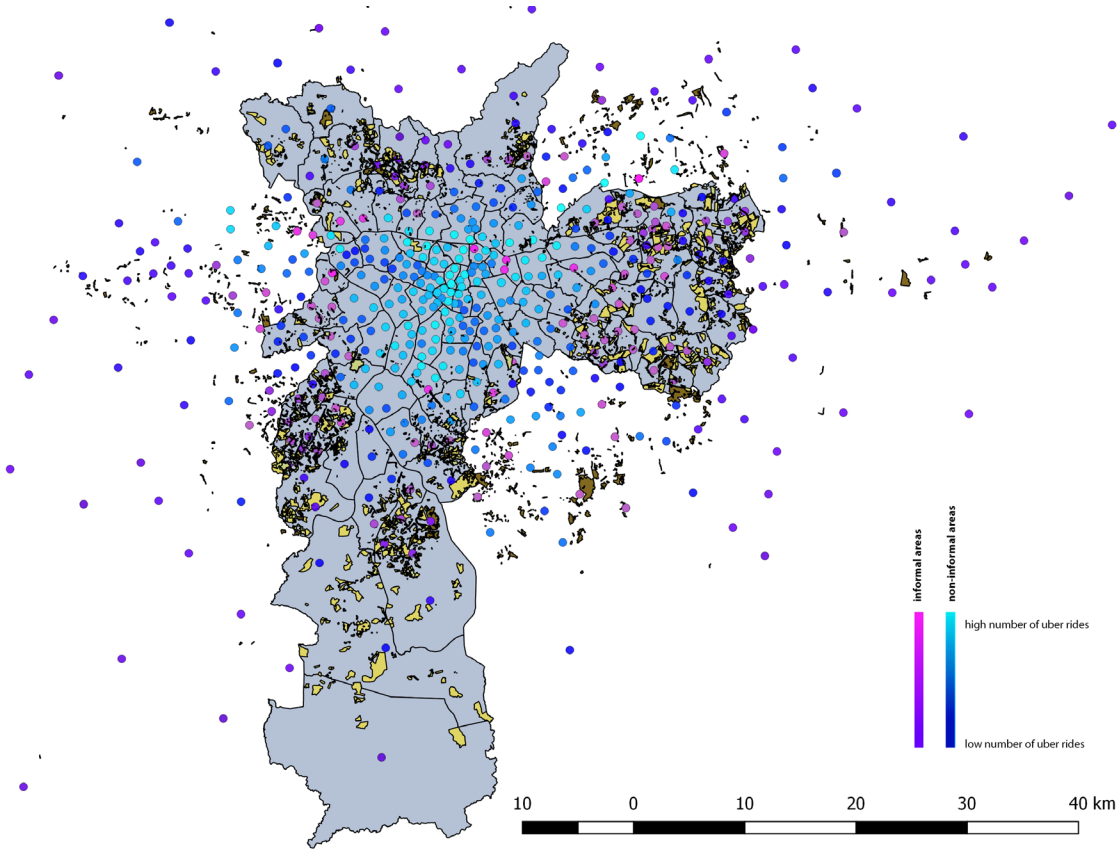

Figure 2. Map of aggregated Uber rides in São Paulo. Source: F.Godino

2.2. Uber in São Paulo

The amount of uber transit from these arear has been calculated thanks to uber movement database on São Paulo (Uber Technologies, Inc.). The source data set refers to last quarter of 2018 and includes the arithmetic mean, geometric mean, and standard deviations for aggregated travel times over the selected date-range between every zone pair in the city. Starting from this our goal was to represent on a map places that showed the highest number of uber arrival and departures. To fulfil this task has been used Python programming language[1]. This base has been imported and graphically elaborated in Qgis, where a distinction has been individuated by boundaries containing or intersecting a favela. The resulting map (Figure 2) shows on an urban level the amount of uber rides starting from or arriving to a favela area. The Qgis analysis was applied to the whole metropolitan area of the city, city-scale map just shows the São Paulo municipality area. In this map the points represent aggregation of uber rides for each geoboundary area. Points' colour represents the total number of departures and arrivals of the area.

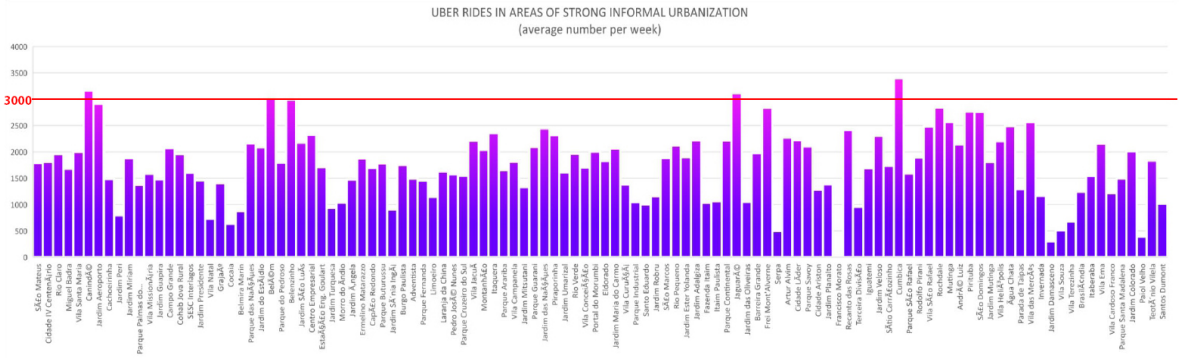

Figure 3. Uber rides in informal areas. Source: F.Godino

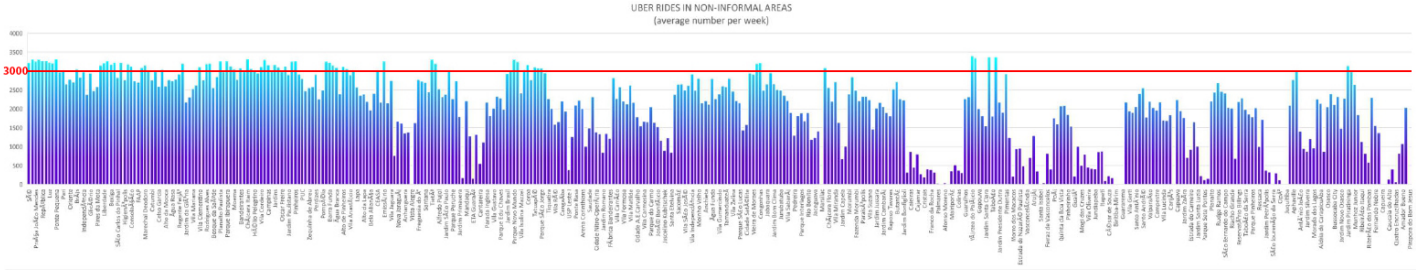

Figure 4. Uber rides in non-informal areas. Source: F.Godino

As it is clear from figures 3 and 4 many favela areas are peaks in uber usage in the city of São Paulo. Among them there are some that reaches peaks of more than 3000. The second relevant fact is that almost 30%of city's uber rides start or arrives in-or very near- a favela. This information has to take into

[1] Data were presented in this form: file1.dow showed a day of the week. Each ID (source and dstid) represents a polygon. These are the basic units to model the city map. From this has been calculated the number of arrivals and departures for each point. (immx) After that he defined each block, defined by the ID, with geographical coordinates. This file was provided by Uber in the "Geo Boundary" section on Uber Movement section (Uber Technologies, Inc.). It consisted of Json files that contains an ID that can be matched with the ID of the previous file associating it with the "geometry.coordinates" field. Each record also contains informations on the name of represented areas. Tecnically we operated an INNER JOIN operation between file1 and GeoBoundaries file on the ID field. The resulting file contains the following fields for each block: geographical coordinates, total rides arrivals, total rides departures.

accounts two factors: high demand of uber transit for favela inhabitants that can actually afford using uber and people from non-informal city going into favelas. Unfortunately, is hard to discriminate among the two starting from current dataset. Anyway, favelas are vibrant markets for small scale economies and a lot of people from outside have to visit it for work purposes. For sure in a lot of favelas there is a strong demand for carhiling services given the lack and the high cost of public transport. The problem of exclusion from uber service is not common to all São Paulo's favelas. Some of them are included or de facto not excluded for being near to neighbours reached by the service, anyway it is a fast-changing situation due to the interest of many agents. In addition, there is the fact that a lot of drivers lives in favela, so the impossibility of serving their own community is quite paradoxical. In fact, recently a carhiling service has been established to fulfil this demand. The name is UBRA and in the intention of creators from São Paulo's Brasilandia favela, it should be the uber for informal city. (Amigo, 2018).

3. Platform housing

3.1. Online rent and gentrification

This field is an example of an inverse trend from the one described for Uber: Airbnb integrates in its network every space that can be appealing for global citizens. This trend is equally dangerous to resident population of favelas: it leads to an increase of prices that often do not coincides with gentrification in the sense of improvement of urban environment and vivacity of little scale commercial activities. This phenomenon became evident in proximity of 2006 Rio de Janeiro Olympic Games (Gaffney, 2015). By that time was already working in Brazil a form expulsion of the most vulnerable strata of community from Favelas: renting an house to a foreign tourist for some weeks gave more reward to owners than renting it to a Brazilian favela resident for the whole year (Neuwirth, 2006). Of course, in the example of Rochina and Vidigal favelas a privileged geographic position on panoramic hills of Rio has to be considered among the factors that leads to this kind of speculation. However Airbnb as main house rental platform for tourism in the world have accelerated this phenomenon, and while in Rio de Janeiro these implications are clearer, the same pattern is happening in city of São Paulo and in Particular in favela areas like Paraisópolis or Heliópolis that have a strategic position in housing market. Airbnb listing prices inside or in the immediate proximity of this favela are in an average-high level, while the favelas inhabitant's average salary is still one of the lowest in the city (Montanez, 2020). In Paraisópolis and other favelas we can now see a process of densification and medium-scale real estate investment boosted by a growing demand both of long term and short-term rent. Because of this platform housing is a perfect tool to penetrate the protected market of favela's real estate. Airbnb generally imply a rise in rent prices and as a result in house prices (Sheppard & Udell, 2016). This factor, united with a large percentage of favela population currently living in rent, is making favelas housing market nore and more hostile to local low-income communities (Marques,2016).

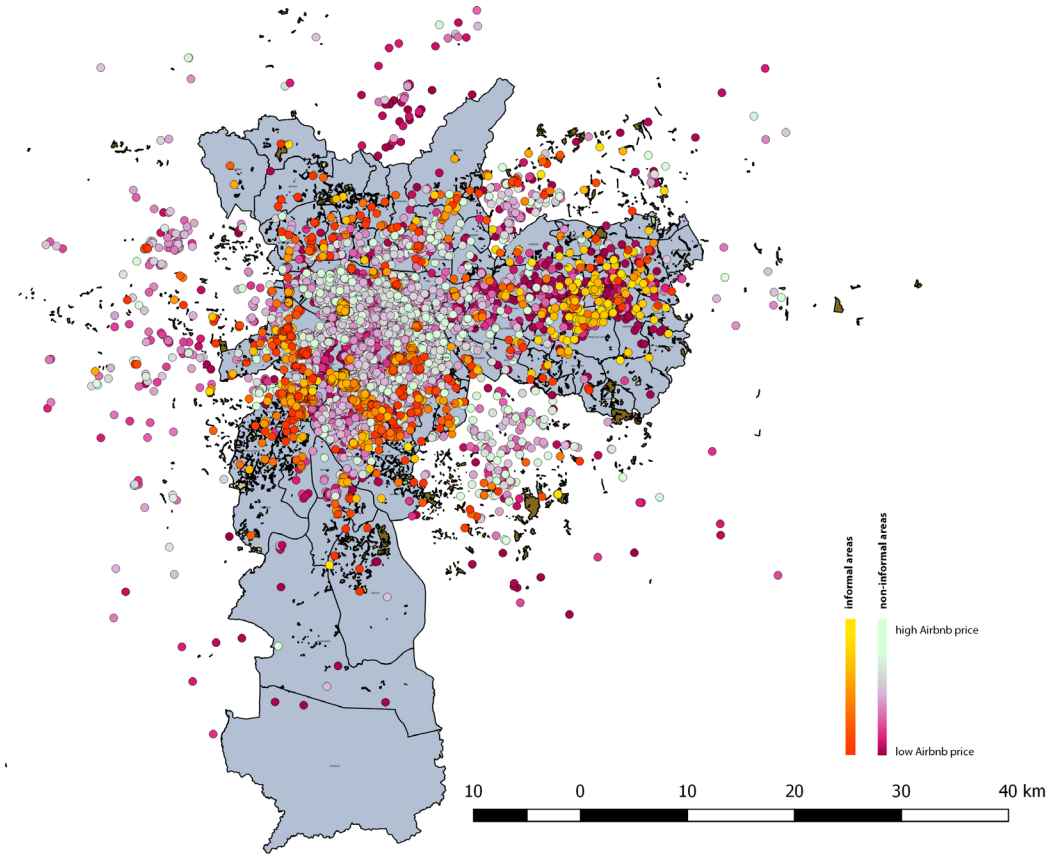

Figure 5. Airbnb listings in São Paulo. Source: F. Godino

5.3. Mapping Airbnb in São Paulo

The map (Figure 5) shows presence of Airbnb proprieties in the city of São Paulo. It has been made thanks to the open-access database of Inside Airbnb by Murray Cox in the city of São Paulo (Cox, 2017). To this huge amount of data has not been applied any clusterization since the specific position inside or outside a favela can affect considerably the price of the single listing. The database has been joined with administrative boundary file in QGIS. Then from all listings have been isolated the ones that found themselves inside or at a 50 meters distance (the half of medium length of a São Paulo urban block) from an informal settlement and the one that are included in areas of "high social vulnerability" (Geo Sampa 2018). In São Paulo often the nearby of an informal settlement are deeply influenced by this proximity in terms of house prices. The regions to which the Airbnb dataset has been linked belongs to a dataset from São Paulo's municipality. This choice has been made because these boundaries represents regions of relatively uniform socioeconomic conditions. Looking at the figures 6 and 7 we have to consider the problem in reporting informal settlements' names, so also in these graphs of "informal settlements and high vulnerability areas" are reported names of non-informal neighbours and data are referred to all data collected in informal settlements in these neighbours. First thing to acknowledge is that data of Airbnb listings coming from informal and high vulnerability areas are proportionally relevant: they represent the 11.12% of the total while the area corresponding the their selection criteria only represents the 4% of the total considered territories. Second characteristic of this data are the high price per night of accommodations in favelas and socially vulnerable territories. This is both caused by the fact that their price is indeed high compared to the economic conditions of their neighbours and to some anomalies in pricing. In some areas are present listings for prices that totally out of market standard for their area (there are al least 15 cases of this disproportion, the most evident in little favelas in the neighbour of

Itaquera reaching prices between of over 5000 R$ per night). On the other hand, presenting high prices in poor areas is a strategy mainly based on the information asymmetry between local and tourists who often ignores that in São Paulo are present a lot of informality and poverty enclaves in otherwise wealthy neighbours.

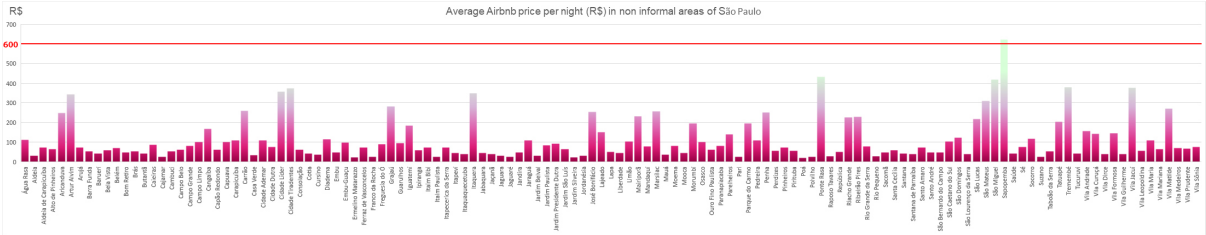

Figure 6. Airbnb average price per night in non-informal areas. Source: F. Godino

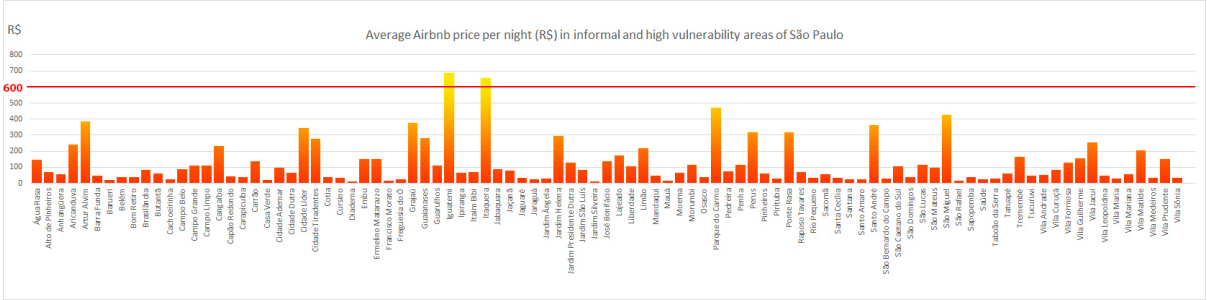

Figure 7. Airbnb average price per night in informal areas. Source: F. Godino

Another important information that we get from these data is the general predominance of entire apartments or houses both in informal (91%) and non-informal (90%) areas Airbnb listings. This evidence strongly contradicts the platform rhetoric of space sharing and integration between people. It shows that Airbnb is mainly used as an investment on a second house, leading to inevitable rise of rent prices in the area. In conclusion we can state that Airbnb in informal areas of São Paulo follows the same dynamics than in non-informal ones, possibly with an even more disruptive effects on urban environments due to the lack of regulation and to the poor economic condition the inhabitants. It is interesting to observe this dynamic in the general framework of the increase of real estate investment in informal settlements of São Paulo. This trend has interested central favelas like Paraisópolis.

4. Platform gentrification

4.1. Examples of platform gentrification in Sao Paulo

Another key factor in the analysis on how digital economies influences physical space of informal settlements in São Paulo is related to social media and in particular Instagram. As L. Manovich stated in its seminal paper on this argument:

"*Social media content shared today in cities, such as Instagram images, their tags and descriptions, is the key form of contemporary city life. It tells people where activities and locations that interest them are and it allows them to share their urban experiences and self-representations*." (Mnovich & Indaco, 2016).

This field shows the same dualism seen in the Airbnb analysis: Instagram is a powerful tool for inclusion of marginalized areas in touristic and economic network, while Instagram-centred processes of gentrification can cause a big harm to the most fragile populations of interested neighbours.

This Processes often starts with high level of digital content production in a specific area that becomes an attraction for tourists and non-informal city residents. You can find these phenomena both in Rio de Janeiro panoramic and "artistic" spots and in São Paulo's main centres of street art. In Rio it has already been underlined how this process has been encouraged by travel agencies during 2006 Olimpic Games (Siqueira, 2018). In São Paulo the most interesting example of gentrification induced by social media is without any doubt the one of Beco Do Batman, a small area in Vila Madalena district that rapidly turned from a neglected and semi informal alley into an attraction and a symbol of cultural vitality of his neighbour (Costa & Lopez, 2013). Taking into account that Vila Madalena was already gaining an "artistic" aura thanks to low prices that drove young artist to choose is as base for their studio and residences (most important the group o "Casa 7" between 1980 and 1985 (Itaú Cultura, 2017)) in a classic art-driven gentrification process. The phenomena changed with the introduction of Instagram and the boost of production and share of images tagged in Beco do Batman. Differently from art-production driven gentrification the process of Beco Do Batman growth in popularity has been related to visits to the area's graffiti and small commercial activities in the nearby as bars and small shops of handmade or alternative merch so that's better described as art-consume driven gentrification. In fact, the medium of graffiti here

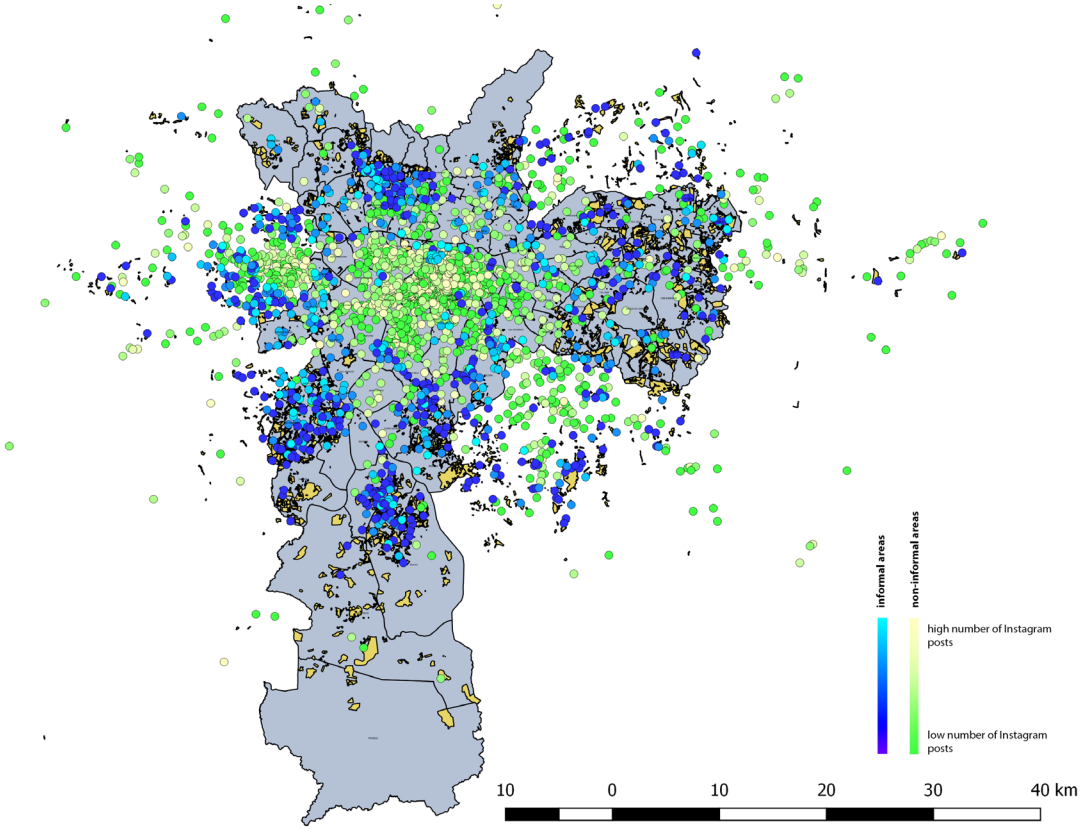

Figure 8. Instagram urban graffiti posts in São Paulo. Source: F. Godino

evolved towards a dispositive meant for reproduction on social media. Artworks often consists of drawing made to be photographed in the background adding physical elements (such as wings or other elements) or context to the person captured in the image and often integrating urban furniture in this spatial layout such as benches, which are coloured and de facto integrated in the artwork. References to the artist's Instagram account are always present in the framework to be included in the picture. Beco do Batman, as well as other local attractions, surely played a role in the recent boom of real estate investment in Vila Madalena, contributing to create its hip aura. But its particularity is the totally Instagram centred popularity that this alley gained. What's more interesting is that this point of view is that the boom of

mainstream popularity of Vila Madalena coincided with an increase of high rise real estate investment in all blocks but the one of Beco do Batman, which has been left untouched not to compromise his local atmosphere.

4.2. Mapping Instagram in São Paulo

This kind of process seems to be recurrent in informal areas thar are highly attractive to real estate market. In São Paulo trends of Instagram popularity of favelas are mainly related do funky music scene, landscape, and street art. This analysis is based mainly on graffiti hashtags that are recurrent in São Paulo's underground scene. The purpose of this choice is to link Instagram popularity directly with forms of artistic intervention on the built environment, excluding other forms of image production that could be misleading in an analysis of Instagram-linked gentrification processes. The dataset for this analysis was obtained through Instagram's API where the research selected four hashtags: (pixo, pixacao, pixosp e xarpi) all linked to the practice of a particular urban graffiti technique called pixo. Among this selection were deleted all posts that was not georeferenced. This approach is meant to link a high reproducibility on social media to a context of deep social fragility. In this way is possible to observe how a phenomenon that express the anguish of informal settlement's life can turn into a mediatic case and give unprecedented visibility to a specific place. The focus of the phenomenon of pixo in this analysis is meant to isolate a specific kind of urban painting that is peculiar of informal settlements (in all the forms of favela, nucleo and cortico). The abundance of graffiti and urban painting in the city of São Paulo would have made a wider data choice a too generic field of analysis to observe such a specific phenomenon.

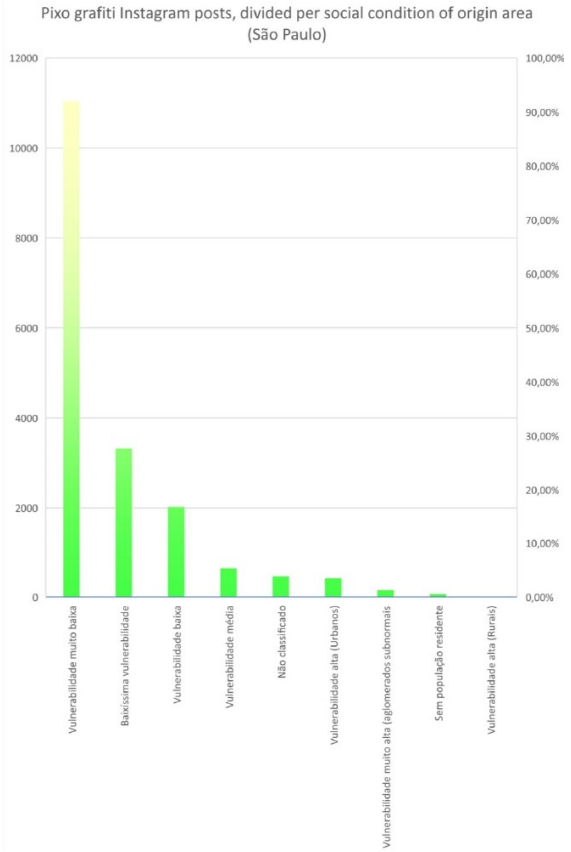

Figure 9. Instagram pixo related posts in non-informal areas of São Paulo. Source: F. Godino

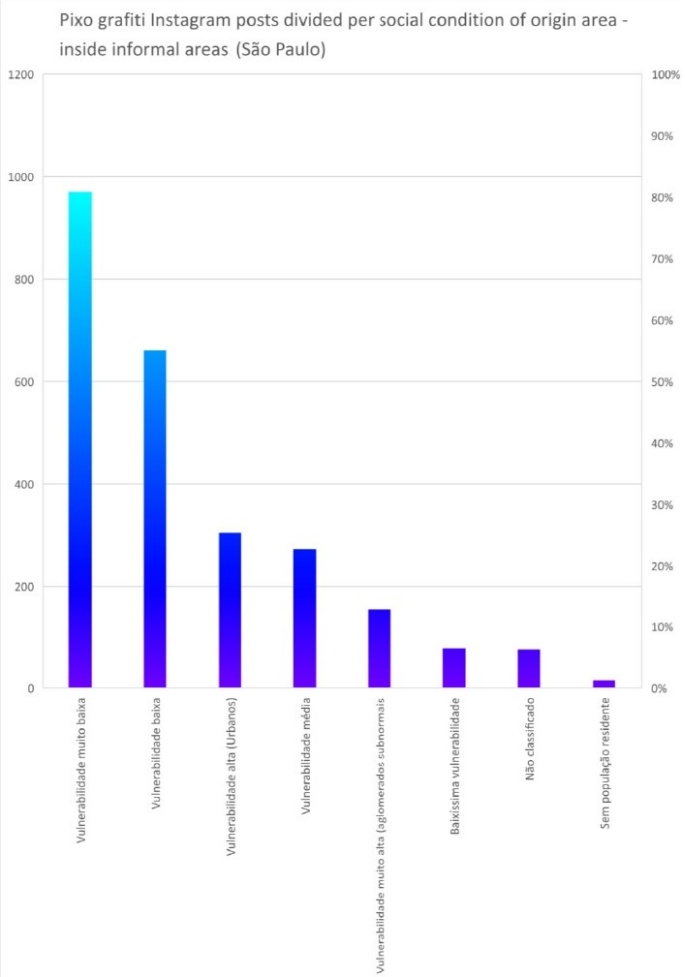

Figure 10. Instagram pixo related posts in informal areas of São Paulo. Source: F. Godino

First thing to acknowledge is that the phenomenon of pixo is not limited to informal areas but it is present in territories of of all social vulnerability and in particular to territories of high density (figure 8). That is because pixo is a practice that tend to appropriate all possible urban surface. Particularly adapt to this purpose are neighbours where coexists a huge number of urban surfaces and a poor system of security. These neighbours are often not listed as high social vulnerability because of the socioeconomic mix they contain: they are medium-high density areas in which coexists commercial and tertiary activities, low and high budget residences and a number of squatted buildings. The practice of squatting is a strong incentive to pixo because squatted buildings, often old high-rise structures in the city centre, are the only actively supporting the phenomenon. As figure 9 shows the largest part of pixo-related posts are located in areas of low social vulnerability. This is coherent with the presence of nucleos and cortices in otherwise medium or high-income neighbours. In fact, as specified in figure 10, almost 10% of all posts by are located inside or near a favela.

The visibility of pixo represents a strong share of urban-related posts in the city of São Paulo and so it contributes to the visibility of these areas. Just like the phenomena of urban painting and other forms of street art, pixo contributes to the creation of an aesthetic value to the neighbour. This atmosphere influences a range of agent that goes from commercial activities to private householders and artistic creators. All these agents, thar are attracted to the area in proportion to the visibility of its artistic atmosphere, easily becomes gentrification agents since the sum of values they bring to their environment makes it more attractive to real estate speculation. In this sense pixo shows a difference from others urban graffiti techniques: its creators are conscious of this process and often the artwork expresses a will

of rebellion against these rules. To do that it avoids classic representation techniques and adopts a rigorous and simple aesthetic. Despite that the effect is quite the opposite of the creator's will and message. The complex alphabet used by pixadores for their messages makes them almost unreadable for unskilled observers reducing them to mere pieces of aesthetic, increasing the visibility of their Instagram representations. This is of course just one aspect of the complex relations between informal areas and social media, but it helps us to understand what kind of processes these technologies introduced in urban development of São Paulo

5. Conclusions

5.1. Uber

The effects of the use of Uber on the relationships between informal and non-informal areas act on multiple layers. The first is the intense use of informal settlements public space. The informal settlement type that is more affected by this phenomenon is favela: in its public space is visible a huge increase in the number of cars due to the popularity of carhiling driver as a full-time job for favela inhabitants. That led to an intense usage of soil as car parking and made economically convenient to use some empty lots as parking instead of using them for construction. A second effect of Uber on informal settlements is the isolation of informal areas. Carhiling, contrary to public transport, allows its users to avoid the problematic areas of the city and that makes informal settlements -and in particular favelas- more and more isolated from the rest of the city. The last consequence deducted from the massive amount of Uber transit in favelas is the lack of incentive in the development of public transport for these areas. Carhiling is becoming a common substitute for metro and bus lines, taking a huge number of users and profits from public transport lines.

5.2. Airbnb

Airbnb acts primarily as a tool of gentrification and the notable fact is the high level of prices in informal settlements, not the relevant presence of Airbnb listings in these areas -which could be considered a positive fact per se if aligned to local housing prices. The high average price of Airbnb in favelas, corticos and nucleos indicates that the offer of short-term rent is mainly oriented to people that normally lives in non-informal contexts. This phenomenon has been already observed in Rio de Janeiro where the aestheticization of Favelas made economically convenient for second-house owners to rent it for a few weeks to foreign tourists rather than for the whole year to local inhabitants and families. That led to an impoverishment of the social tissue of favelas and to a growing problem with internal displacement of people evicted from their favelas and forced to find a new place in even more peripheric and poor areas.

5.3. Instagram

Instagram data are not linked to a direct economic indicator nor to a precise spatial output, like for Uber and Airbnb ones. The first notable result that can be deduced from the vast distribution of informal settlements-related pictures is that in São Paulo these images represents an aesthetic trend. Informal settlements are very popular on Instagram: we can find a massive distribution of images related to informal aesthetic and tagged with informal-related tags even very far from informal areas. That is in part due to the strong action of aestheticization currently investing Brazilian favelas. Starting From the most panoramic spots of Vidigal in Rio, informal settlements became an attractive ground of investment for tourism. This trend invested also informal areas of Sao Paulo situated in strategic spots, for example

Paraisòpolis favela that is surrounded by the residential skyscrapers of Morumbi. The popularity gained by these areas acts as a distortion of the image of informal settlements and as a gentrification tool.

5.4. Combined conclusions

The three of these analysis shows how informal areas of São Paulo are vulnerable to all the negative effects of platform economies. As already stated this do not imply that platform economies can't produce positive outcomes when introduced in an area with strong informality presence, but rather that for the present situation of the city these economies seems to rely to a situation that allows them to access both a cheap workforce and a flourishing new market in informal areas. None of these aspects are an advantage to informal settlements residents. What is even more visible is that the negative effects of platform economies are contradictory, for example one tending to a maximum exploitation of free space for uber parking and another tending to the anesthetization of public space causing a gentrification led by external agents. In this frame is hard to synthetize the effects of these new technologies on the city's physical form. It is better to acknowledge a complex set of processes, in large part hostile to informal communities' residents, acting simultaneously and independently on the city's social and physical fabric. To subvert this state of things would require acting on a normative level to regulate the activity of these platforms, in particular Uber and Airbnb that are host for economic transactions. Of course, the rise and existence of these companies is deeply linked with a normative gap in existing legislation regarding online businesses, so they are generally hostile to a deeper stronger by public authorities.

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