The morphological faces of Barra da Tijuca in Rio de Janeiro (Brazil)

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ABSTRACT
The urban revolution of Barra da Tijuca-RJ was characterized by a late growth, due to its location, to be an immense sand and concentration of great extensions of land in the hands of a few. This finding reflects subsequent actions in the region, where the real estate growth process and road connections were the focus of urban actions. Lucio Costa’s pilot plan, with modernist characteristics, arises from the need to anticipate the uncontrolled and inevitable occupation process of the area. The plan aimed to prevent the reproduction of what had happened with other neighborhoods on the Rio de Janeiro coast, which were experiencing intense densification. After 50 years, several changes were made to update the plan to the present, to remedy some points in which the plan did not have enough detail and many that succumbed to real estate pressures. In this way, this article aims to analyze the transformations that took place in Barra da Tijuca, from the implementation of the plan to the current urban fabric, and verify the urban design performance and real estate pressure as modelers of the neighborhood.


1 INTRODUCTION

The “Barra da Tijuca” region was originally an immense sandy area, full of swamps and unsuitable for planting. Primarily, in 1667, it was donated to Benedictine religious and in 1920, where the Baixada de Jacarepaguá is located, sold to Empresa Saneadora Territorial e Agrícola S.A. (ESTA), still today a large landowner in the area. The concentration of large tracts of land in the hands of a few was one of the causes of the late growth, in addition to the difficulty of accessing the region as it is separated from the rest of the county by large mountain ranges. This finding reflects subsequent actions in the region, where the process of real estate growth and road connections were the focus of urban actions.

To understand the Barra da Tijuca development, it is also necessary to understand the history of the South Zone and how the real estate sector migrated to the western portion of the county. In the first three decades of the 20th century, there was already a nucleus in Rio de Janeiro that was valued for investments in public and private urban equipment and services and a poor periphery, where self-construction in irregular subdivisions without infrastructure were predominated (LAGO, 1997). In the 1930s, the South Zone went through several real estate investments that act in the verticalization of the area. In the 1950s, there was a drop in real estate investments in the city and, therefore, there was a change in the strategy, including apartments with smaller metreage, which facilitated access to these areas for the lower middle class, Copacabana, for example, has 31,000 studios and almost half of the residences in the neighborhood measure up to 60m² (ABRAMO; FARIA, 1998, p. 424). This form of market performance had repercussions on the rest of the South Zone, which caused the containment of verticalization in other neighborhoods and the departure of the higher income classes to other areas. According to Abramo and Faria (1998, p. 424), at the beginning of the 1960s, the consequences of the urbanization process started in the 1930s were presented: population increase, housing shortages, social segregation as a result of the increased concentration of income in the hands of the wealthy social classes (wage squeeze policy in the 1964 period).

This income concentration policy in the hands of a few generated an increase in real estate speculation, which boosted the displacement of the upper class towards São Conrado and Barra da Tijuca (ABREU, 1987). According to Abramo and Faria (1998, p. 425) “the creation of the Housing Financial System (HFS), aimed at the middle classes, decentralized real estate investment to the North Zone and suburbs, and caused the real estate boom in Barra da Tijuca in the 1970s.”. Real estate investments in Barra da Tijuca were intended to attract the upper
class, and for that, "gated communities" were launched as a new way of living, a fact that changed the skyline of the area and implemented the residential characteristics that are followed to this day in the neighborhood.

2 BARRA DA TIJUCA PILOT PLAN

The Plano Piloto, according to Lucio Costa, arises from the need to anticipate the process of uncontrolled and inevitable occupation of the area, enhanced by the free access created thanks to a combined system of tunnels and viaducts carried out by Highway Department (HD) in its attempt to prevent the reproduction of what had happened in other neighborhoods along the seafront, such as Copacabana, Ipanema and Leblon, which were experiencing intense densification.

The plan had two structural points: i) a cross-shaped road layout comprising Rodovia BR 101 (currently Avenida das Américas) and Via 11 (Ayrton Senna) and ii) A Central Business District (CBD) with 5 square kilometers called Centro Metropolitano da Barra Barra Metropolitan Center.

The plan was presented in 1969, nine years after the one carried out by the same urbanist architect in Brasília (Figure 1).

![Figure 1: Barra da Tijuca Pilot Plan](source: Casa de Lucio Costa collection)

Before Lucio Costa, there was a Plan of Guidelines for Arterial Ways that predicted parallel streets along the entire length of the lowland, except for the areas where the Jacarepaguá and Tijuca lagoons were located. In Lucio Costa Pilot Plan, he revokes several parts to implement what he considers “appropriate measures for the implementation of the indispensable infrastructure for the orderly development of the region” (COSTA, 1995, p. 346).

The plan covered 120 kilometers and predicted lots of varying sizes, with reduced occupancy rates balanced with higher rates in strategic locations. The alternation of typologies in the building was very present in the plan. This diversity of verticalization and also of spacing between buildings can be divided into three main “profiles”: the buildings along the BR 101, in the dune area and in the metropolitan center.
The more vertical layout in the CBD and more horizontal in the periphery reflects the modernist thoughts of Le Corbusier, who thought of this volumetry for the contemporary and radiant city in the 1920s and 1930s.

Along the BR-101, Lucio Costa thought of a low-rise housing verticalization, so as not to attract real estate speculators, but rather, autonomous architects. In this way, he defines the depths, apartment quantities per floors and number of floors.

On the land side, these core of diverse and autonomous urbanization, designed and detailed under the personal responsibility of independent architects from a construction or real estate firm, would consist of a set of eight to ten storey buildings, with a depth limited to only two apartments, in order to avoid excessive built-up masses, each set also has a certain number of economic blocks of four apartments per floor, with double access, three floors and pilotis (COSTA, 1995, p.348-349).

He also predicts the articulated trades in residential buildings, which calls an “autonomous ground floor system” (COSTA, 1995, p.349). In this project, the stores would be arranged horizontally, with a covered walkway, where at certain times there would be changes of direction, creating squares, recreation areas for children and patios for living. According to Costa (1995, p.349), “all with the objective of providing convergence instead of dispersion”.

This integration thought with open space is also observed when analyzing the insertion of road flows. At the articulation points of the roads, Costa thought of inserting low-rise buildings, for specific purposes of public or private use, so as not to harm the urban landscape. Residential buildings would be diagonally connected by a road parallel to the BR, duly widened and with tree-lined edges. Contained between these parallel roads, there would be a winding network of alleys for access to the residential lots.

These residential lots would have a reduced occupancy rate (10% for two floors or 20% for the ground floor). In order to achieve integration, Costa limits the use of walls, which could not be used on borders and alignments, only hedges and gates, “so that, despite the occupation, green will prevail” (COSTA, 1995, p.349). He also defined that in these horizontalized areas, there would be centers of commerce and services to supply the daily needs of the users. In this sense, Lúcio Costa proposed a less radical uses sectorization, adapting modernist thoughts to the Carioca population needs.

In the dune strip, between the road and the Marapendi lagoon, the cores would present an irregular distance from the road and a lateral setback of around 1 Km. This isolation would provide good aeration, not harming the sea breeze from entering the coast. The limited number of towers would have a height equivalent to four times the dimension of the floor plan, approximately 25 to 30 floors, contemplating commerce on the ground floor or below. Costa (1995) emphasizes that these buildings would also be designed by responsible autonomous architects.

To meet the demand, the state would be responsible for building a complex road system and implementing basic infrastructure.

At the core of the area there would be a metropolitan center, called CBD (Central Business District), which would be a counterpoint to the traditional center in the consolidated city (Figure 2). The area of approximately 5km² in the octagon shape would be entirely expropriated by the city and occupied with buildings in a kind of public-private partnership. The interconnection of this location would take place by two major road axes and smaller circulation routes.
2.1 Lucio Costa Pilot Plan after 45 years

The first ten years of the Pilot Plain implementation took place in a criterion manner. The projects for future buildings were submitted to the appreciation of a technical team from the Barra da Tijuca Development Superintendence (from portuguese, Superintendência de Desenvolvimento da Barra da Tijuca - SUDEBAR), which analyzed the projects on a case-by-case basis to fit into the urban plan. For Lucio Costa, this was a time when “projects for the region were frankly discussed with stakeholders and control over excesses”. Costa did not want the plan to be something that would plaster the area, however, this occupation should take place in a way that does not give up environmental preservation. Rezende and Leitão (2003) report that this flexible posture did not work, because to happen, the public power had to fulfill its regulatory and supervisory role, which did not.

The changes began to occur in two directions: real estate and conceptual. According to Leitão (1999), the first changes recorded were those demanded by the real estate sector, highlighting the emblematic change proposed by SUDEBAR in 1976, which changed the quota of use from 60 to 100 meters of areas located between the old way of Guaratiba and land considered usable in the Tijuca Massif. The conceptual changes, also to meet real estate demands, sought to modify uses and eliminate sectorization, something that went against modernist principles. One of the examples is the case of the proposal presented by SUDEBAR for the densification and heterogeneity of use on the seafront, similar to the occupation of Copacabana. Decree 3046, in 1981, changed building layouts and created new installment conditions authorizing the construction of residential hotels along the waterfront, a fact that was contrary to Lucio Costa’s plan, where the hotels would be sectored at the established ends of the waterfront.

In the same year, Lucio Costa left the superintendence, which led the Municipality of Rio to set up a special commission of inquiry in 1984, which concluded that there had been
deformations in the plan (GERBASE; AUTRAN; CANDIDA, 2013). In 1994, in commemoration of the 25th anniversary of the creation of the Plano Piloto, in an interview for Jornal do Brasil (1994), an upset Lucio Costa commented:

The plan was a personal conception for the rational occupation of that area. I did not contemplate, for example, this idea of lack of coexistence between the residents of each condominium [...] I don’t even remember having been the creator of this project. He was born a beautiful son, much praised and always loved. Then he grew up and disappeared into the world. The only urbanistic certainty is that things never go as planned.

Several changes were made over time, several to update the plan to the present, others to remedy some points where the plan was not detailed enough and many that succumbed to real estate pressures.

The land where Lucio Costa’s CDB would be located is in the hands of private groups such as Carvalho Hosken, Teruskin and CEF (in litigation) that are carrying out isolated projects. The octagon format and the established template are respecting the ideas of the initial plan, however, the flow connections will probably not be followed.

The peninsula and the area that extends around 1km² that extends from the back of the Via Parque mall towards Lagoa da Tijuca would gain specific projects guided by SUDEBAR. The first proposal was for 14 circular buildings with six to eight floors designed by the architect Sérgio Bernardes. According to Carlos Carvalho (owner of the land) for O Globo (GERBASE; AUTRAN; CANDIDA, 2013), he sought justice to obtain the right to raise the peninsula’s standard, invoking the principle of isonomy and managed, after two decades, to change. Currently, the area has 109 buildings of 15 floors and the other land (which in the plan could grow vertically up to 5 floors) is receiving 80 buildings of 12 floors.

Regarding the flow of cars, from the secondary roads of the plan, four did not leave the paper and two were partially completed. The 11th via, currently Ayrton Senna Avenue, had a special afforestation plan, to be created by Burle Marx. Between Américas Avenue and the future CBD, rows of imperial palm trees would be planted, however, currently, in addition to the absence of palm trees, the Cidade das Artes cultural building is located at this intersection. According to Hugo Hamann in an interview for the newspaper O Globo (GERBASE; AUTRAN; CANDIDA, 2013) one of the biggest attacks on the plan was the insertion of Cidade das Artes, where Lucio Costa predicted a road interchange connecting and distributing flows.

3 A BARRA DA TIJUCA AND THE REAL ESTATE SECTOR

Three periods/layers of development of Barra da Tijuca can be highlighted, pointed by Nunes-Ferreira (2014): i) modernist, ii) generic and iii) dispersed.

The first layer takes place in the 1960s, which marked the beginning of the Barra development and its current morphology. The Guanabara state governor, Negrão de Lima, commissioned urban planner Lúcio Costa to create an urban project for the area. The Barra da Tijuca Plain Pilot of 1969, from modernist inspiration, with large avenues and wide open spaces, definitely marked the beginning of the peculiar Barra lifestyle. According to Rezende and Leitão (2003, online) the Plain Pilot for Barra da Tijuca was “the highlight of a process of adhesion and consolidation of modernist ideals that has been developing since the 1930s”.

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The second layer, entitled “dispersed urbanization” by Nunes-Ferreira (2014, p.10), was carried out from the 1970s onwards, when major infrastructure works were built. As an example, the construction of the Lagoa-Barra Highway (including an acoustic tunnel) can be observed, which allowed for further development, reduced transport time to the south zone of the city of Rio. This period was also characterized by the implementation of several condominiums and subdivisions with blocks. Thus, the Nova Ipanema and Novo Leblon condominiums emerge, “whose sales presentation is based on the possibility of recreating spaces similar to those of the old neighborhoods of the city, but designed without their supposed vices, thus becoming areas segregated both physically and socially” (REZENDE and LEITÃO, 2003, online). During the 1980s, Barra da Tijuca experienced a population explosion, with practically all the land along its avenues occupied by large residential condominiums, parks, supermarkets, shopping centers, schools, hospitals. The avenues were duplicated and received signage. In this period, the emergence of apart-hotels (residential and/or tourist use) stands out, which attracted the attention of the real estate sector due to their constructive potential. At that time, there was also a movement for emancipation in the region of Barra da Tijuca, with the majority of voters voting for the separation of Barra, but the result of the plebiscite was not enough to implement it due to the quorum of voters being below the minimum required.

The third layer takes place in the 1990s, when a new real estate “boom” occurs with the launch of large commercial buildings. Regarding residential housing, “continuing a process started in the 70s, condominiums are called new, appealing once again for the (re)construction of a new neighborhood to the old city” (REZENDE and LEITÃO, 2003, online). It is the city of consumption, where a new product must be launched all the time to satisfy capitalist desires. A major milestone, in terms of roads, was the creation of the Linha Amarela (the expressway that connects Barra to Ilha do Fundão), that enabled better accessibility with the North Zone of the city.

As can be seen in Figure 3, the west axis of the municipality has shown, in ten years, an intense population growth. The population in the country increased 12.3% in the last 10 years (IBGE, 2000-2010), the city of Rio de Janeiro 11.1% where 72.54% were in the Barra da Tijuca Administrative Region (A.R.).

Figure 3: Percentage of population variation between 2000 and 2010.

This modification is corroborated, as shown by Abramo and Faria (1998, p.425) with data that demonstrate changes in the share of residential real estate production. In 1976 it was 1.4%, rising to 20% in 1978, in the 1980s: the verticalization rate was 2.1% households/building. In the period between 1991 and 1995, the share of real estate production in Barra da Tijuca A.R.
was 30% of the city's production, where the Barra da Tijuca neighborhood stood out with 49%. Another indicator factor in the changes that occurred in the A.R. is the increase in the number of transactions with the residential stock, which went from 0.24% in 1970 to 10.7% in 1995 (Figure 4).

Figure 4: Composition of Real Estate Transactions in Barra da Tijuca.


For IBGE (from portuguese, Brazilian Institute of Geography and Statistics) president Eduardo Pereira, in an interview with O Globo Journal, what most drew attention in the 2010 data was the continuity of the city’s expansion process towards new areas, which he called “the extension of Barra and West Zone” (PEREIRA apud SCHMIDT, 2011). In this extension it is possible to verify a dispute between the Barra da Tijuca and Jacarepaguá neighborhoods. “The history of the structuring urban space process in Barra da Tijuca and Jacarepaguá Lowland is directly related to capitalist real estate production” (COCCARO, 2013, p. 03).

The preponderant age group of heads of household is adults, from 40 to 49 years old (IBGE, 2000), although the oldest resident age group is from 30 to 34 years old, followed by those from 35 to 39 and from 25 to 29. The average income nominal of the head of permanent private households is mostly greater than 20 minimum wages (IBGE, 2000), which makes it possible to characterize the neighborhood as having a high budgetary standard. In a comparison with other neighborhoods in Rio de Janeiro, in terms of average nominal income in minimum wages above 20, Barra da Tijuca ranks first, according to IBGE (2000) (Figure 5). However, if we only check the average income of the population, Barra da Tijuca is the second highest monthly per capita income in the city of Rio de Janeiro (Figure 6).
Figure 5: Persons Responsible for Permanent Private Households according to Average Nominal Income in Minimum Wage in Barra da Tijuca.

**Figure 6:** Persons Responsible for Permanent Private Households according to Average Nominal Income in Minimum Wage above 20 – comparison between the top ten.


**NOTE:** "Income" = sum of all income received or receivable in July 2000; "without income" = who did not have any income or was paid only in benefits; "minimum salary" = R$151.00

However, another analysis is necessary, of social inequality, indicated by the Gini Index. In Figure 7, it is possible to notice that although Barra da Tijuca leads the category with the highest salaries, it is also the first in terms of greater social inequality.

**Figure 7:** Social Inequality through the Gini Index.

Source: Brazilian Institute of Geography and Statistics – IBGE – microdata from the 1991 and 2000 Demographic Censuses – Calculations – Agreement IPP/IUPERJ/IPEA and FJP-MG

According to research carried out by the Center for Social Policies (CSP) of Fundação Getúlio Vargas (FGV) in partnership with Citizenship Action against Hunger, Misery and for Life.
(Ação da Cidadania contra a Fome, a Miséria e pela Vida) and with Banco Rio de Alimentos, from SESC, the Barra index was 0.59 (the highest in Rio de Janeiro), very close to the Brazilian index of 0.60.

In a report by O Globo (2003, p.22) with a strong title “Barra da Tijuca: where Rio is more unequal” (Figure 8), it shows that just by dividing an avenue, families live in high-class condominiums and others in a precarious favela. The “Limit” designated by LYNCH (2011, p.69), in this case, differentiates the social situation in which the residents of Barra da Tijuca live.

Figure 8: News with the title “Barra da Tijuca: where Rio is more unequal”.

According to a land use map in the Barra da Tijuca area, it is possible to identify that the predominant occupation is residential, with commerce and services along the main roads. The leisure areas currently identified are made up of areas related to culture and sports. From 2004 to 2012 there were some changes in this use, such as the expansion of empty and residential areas and the reduction of woody grass cover, in addition to the increase of leisure areas to the North and West (in the Olympic complex of Barra and in the Parque Recreio Farm) and a decrease to the East (former Enchanted Land). The number of commercial and service properties totaled 19,670 in 2011, a much smaller number compared to residential properties (97,211). However, when analyzing the square footage of these projects, they exceed that of residential properties (Figure 9).
One of the factors that can express these data is the number of shopping malls in Barra da Tijuca. In 2012, the neighborhood had four large developments (which expand over time) and three more malls are planned. In total, companies invested R$ 1.36 billion in shopping centers in the region and created over 152,000 m² of gross leasable area (MOURA, 2012). According to José Isaac Peres, president of Multiplan, in an interview with Valor Econômico (MOURA, 2012), the migration of headquarters of large companies from downtown to Barra, reflects in a new profile of resident for the neighborhood, which are the executives in search for more comfort and quality of life.

4 FINAL CONSIDERATIONS

In this way, from the analyzed data, it is possible to characterize Barra da Tijuca as a neighborhood with strong verticalization marked by high real estate growth and with an upper-class resident population. It was also possible to notice that it has large urban voids and free or environmentally protected areas. These empty areas and future real estate capital, if we follow the logic shown in the graphs presented, largely reflect the urban development over the years that the neighborhood has passed, where the practice of reserve stock and the various real estate “booms” were parts present in the historical context of the region. According to Coccaro (2013, p. 01) this growth took place because the lands, previously in the condition of reserve stock of capital in the hands of few owners, are now part of an “innovative dynamic, personified in an urban area ready to occupy its strategic area”. global city positioning”.

It is concluded that Barra da Tijuca is a place of strong political and economic interest, as it is a vector of development. In this context, the place fits as a focus of attention and competition in a globalized economy with a strategic urban policy. It is also possible to see how the urban design/government was not strong in relation to the strong performance and imposition of the real estate sector, which deformed the main concepts of the plan.
5 REFERENCES


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