Le Corbusier's Modernism in Lucio Costa's Pilot Plan for Brasília, 1960

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The influence of Le Corbusier's works, both written and architectural, is undeniable not only in Europe but also throughout the Americas, despite being separated by an entire ocean. In Brazil, Le Corbusier's modernist ideas resonated particularly strongly with both Oscar Niemeyer and Lucio Costa, young architects who believed that modernism could solve the many issues that contemporary Brazil was facing at that time: rapid industrialization, urban concentration, and most importantly, international expectations. While Niemeyer designed many of the governmental buildings **(fig. 1)**, Costa adapted Le Corbusier's principles to plan the layout of Brasília, the new capital of Brazil that he hoped would reinvigorate and solidify a unique national identity. Brasília was inaugurated in 1960 with great anticipation[1], but decades later, Costa's intention has yet to be realized. Ironically, the problems with Costa's Brasília are similar to those of Le Corbusier's A Contemporary City of Three Million: namely, the lack of attention given to the human experience and the inflexibility towards unforeseen future developments.

Modernism in Brazil

Neo-colonialism was Brazil's first attempt to reinvent modern Brazilian architecture, which had long been an uninspired derivative of European styles (an unfortunate consequence of the country's colonial history) but it was unable to tackle the growing need of urban housing[2]. In 1935, Le Corbusier himself collaborated with Brazilian architects to design a new building space for the Ministry of Education and Health[3]. Lucio Costa, was among these Brazilian architects. Already well-versed in Le Corbusier's philosophy, Costa rejected neo-colonialism and converted to modernism, convinced that "it would meet the needs of the new social reality"[4].

Like Le Corbusier, Costa and the modernists championed functionalism and structural rationalism over ornamentation and unnecessary embellishment.

FIGURE 1
Palácio da Alvorada, residence of the President of the Republic, designed by Oscar Niemeyer
source: Portal do Governo de Brasilia

Unlike Le Corbusier, however, the modernists broadened their scope and recognized the importance of acknowledging the architecture of previous centuries. Brazilian modernist architects adopted the "simultaneous role of innovators and followers of traditional principles", in that they believed the past and the future could coexist not only peacefully but also harmoniously[5].

The Case for a New Capital

In the middle of the 20th century, Brazil was eager to assume its position as a potential international powerhouse. The New State (Estado Novo, 1930-1045), a period of rapid industrialization and urban growth, had stimulated Brazil's economy and gave rise to a large wave of renewed nationalism[6]. Consistent with the national motto – Order and Progress (Ordem e Progresso) – President Juscelino Kubitschek's campaign promised a new capital city to achieve "fifty years of progress in five"[7]. The public strongly supported the creation of a new capital in the hopes that doing so would launch Brazil onto the world stage as a formidable player[8]. In addition to enriching the Brazilian psyche, the construction of this new capital in the nation's center was intended to encourage development in areas that were sparsely populated[9]. Kubitschek hoped that this relocation would create new jobs and highway networks to connect the nation's interior with the more developed coastal regions[10].

The construction of Brasília was on a tight schedule because President Kubitschek not only wanted to fulfill his campaign promise, but also inaugurate the city while still in office. Kubitschek approached Oscar Niemeyer and asked for his help in designing this new city. Niemeyer had been commissioned by Kubitschek several years earlier, when the latter was only the mayor of Belo Horizonte, to design many buildings for Pampulha, a new neighborhood within Kubitschek's jurisdiction, which became a great architectural success[11]. Niemeyer was responsible for designing the governmental buildings, but he organized a national competition to determine the layout of Brasília[12].

Costa's submission to the competition was significantly thinner than the other twenty-five entries; his submission consisted of only a few sketches (**fig. 2**) and an accompanying handwritten text[13]. His plan for Brasília, however, captured the attention of the contest's judges because it was a "closed" design, in that "it conceived…the city as a rigid, integrated whole rather than as an organism which could be permitted to grow by accretion as the historic city has done"[14]. The rigidity of Costa's plan was a deciding factor, given Kubitschek's accelerated timeline. Despite

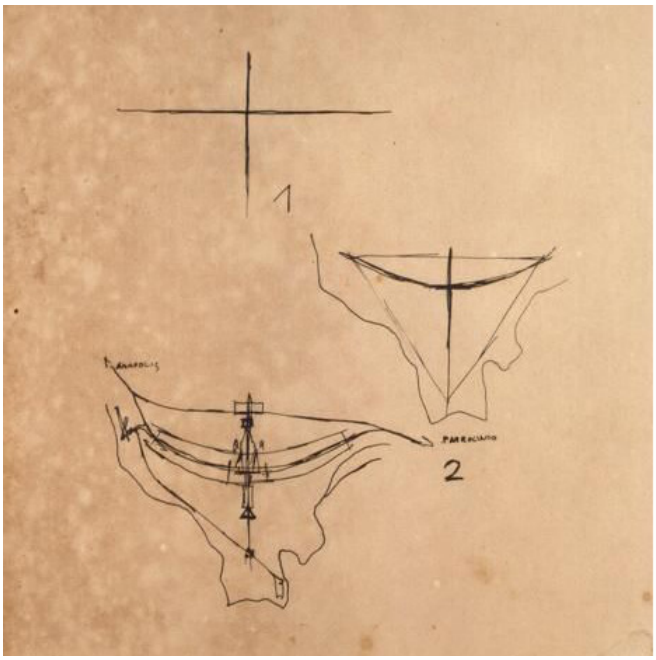

FIGURE 2
Lucio Costa's sketch proposal for layout of Brasilia, source: MIT Department of Architecture

accusations of recklessness from his critics, Kubitschek remained true to his word and Brasilia was designed, constructed, and inaugurated in only four years[15]

The Pilot Plan of Brasília

Costa's Pilot Plan of Brasília is a practical application of the principles and concepts of Le Corbusier's A Contemporary City of Three Million. Like Le Corbusier, Costa believed that the city should be designed in response to contemporary challenges and circumstances, rather than in remembrance of the past or in anticipation of the future. Costa planned for Brasília to have a population cap of 500,000[16]. The construction of an entirely new capital city provided Costa with the opportunity to select an ideal site for Brasília that satisfied Le Corbusier's requirements: flat topography to reduce traffic congestion and relatively distance from a flowing river, although the city is located on the banks of the artificial Paranoá Lake[17].

One of the most pressing issues of building an entirely new city is the tremendous cost of construction. Le Corbusier preferred to build new cities on ideal sites, rather than build upon and improve existing cities, but he failed to consider the financial burden, much less who was responsible for shouldering it. The construction of Brasília was heavily criticized for "[undermining] the monetary system and [threatening] the entire economy" due to its considerable cost[18]. The total cost for the construction of Brasília was $19.5

billion, in today's dollars. Not only did the Brazilian government have to pay for the city itself, but also the artificial lake and the network of highways that would connect Brasília to coastal cities. While this approach may suffice for the construction of a single city, it is neither practical nor sustainable as a general city building principle.

Brasília's general design (**fig. 3**) is essentially two intersecting axes, often compared to the shape of a bird, a cross, or most likely, an airplane[19]. This imagery was meant to capture the imaginations of the Brazilian citizens, as well as represent Costa's confidence in the county's future triumphs and innovation. Costa incorporated into his plan the modernist concept of functional zoning, in which the residential areas are kept separate from the commercial and cultural area. The shorter of the two axes, referred to as the Monumental Axis, runs roughly east to west and consists of the administrative and governmental buildings of the federal government, many of which were designed by Oscar Niemeyer[20]. This Axis was designed to have a grand and imposing nature befitting of a national capital. The longer residential axis, also called the Highway Axis because it follows the path of a major eight-lane highway, runs approximately north to south. Along the Highway Axis on either side are residential complexes called superquadras ('superblocks' in English) that were meant to have a more intimate quality to contrast with the pomp of the Monumental Axis.

At the point of intersection, Costa placed a central bus station. Both the Highway Axis and the central station further two of Le Corbusier's basic principles: "We must de-congest the centres of our cities" and "We must increase the means for getting about"[21]. The major roadway serves as a main artery through which motorists can enter and leave the city without causing traffic issues while the central station ensures convenient transportation for the city's inhabitants.

In designing Brasília, Costa was very aware of Le Corbusier's influence and thus, made conscious attempts to distinguish his own plan. He claims to have drawn inspiration not only from Paris and Le Corbusier, but also from New York's uninterrupted freeways and England's green spaces[22]. Arguably, the

FIGURE 3
Satellite image of Brasilia, highlighting the Monumental Axis and the Highway Axis, source: NASA Earth Observatory and author

lack of cross-roads and the prevalence of green spaces are still prominent characteristics in Le Corbusier's plans for A Contemporary City.

There are, however, differences between the two plans that are fairly apparent. Costa does not use Le Corbusier's rectangular shape or gridded block layout, in favor of the aforementioned airplane shape and a less structured layout. The most striking difference between the designs of Costa and Le Corbusier is their respective use of skyscrapers. In A Contemporary City, skyscrapers dominate the cityscape, while in Brasília, very few (if any) buildings achieve the same heights. Le Corbusier intended his skyscrapers to be for business purposes but Brasília's focus was governmental power and identity, which would explain his decision to leave skyscrapers out of his city plan. If they had been incorporated, the towering skyscrapers would have competed with and distracted from the government buildings along the Monumental Axis, shifting focus away from Brazilian national pride.

Superquadras & Social Class

Rows of housing blocks, called superquadra, flank the residential Highway Axis on both sides (**fig. 4**). Costa meant for the superquadra to be a self-sufficient mini-village; in addition to housing, each superquadra would also have its own school, community center, church, and commercial area all within walking distance[23]. The blocks were 300 by 300 meters to house a population of 3,000. Each block contained six to eight rectangular buildings arranged within green space, though the exact arrangement varied[24]. Costa also did not prescribe a specific architectural style and instead provided only a few restrictions, including a maximum height of six stories and a separation between motor traffic and pedestrian traffic[25].

The most remarkable element is that, while the placement of shrubs and trees are typically secondary concerns, Costa elevated their role in the residential architecture (**fig. 5**). When walking through a superqudra, it is the greenery that dominates your views. The ubiquity of trees and foliage provided a consistent appearance from superqudra to superqudra despite variations in the buildings' architecture and layout. In order to allow the greenery to stand out, the buildings themselves were inconspicuous and undemonstrative; the architecture was supposed to simply "dissolve before the spectacle of nature"[26]. The trees provided relief from the sun and shaded open spaces for the inhabitants' recreation. Additionally, within each superquadra, a different species of tree was planted to encourage visual diversity between the blocks, foster a sense of community within the block, and assist pedestrians with wayfinding.

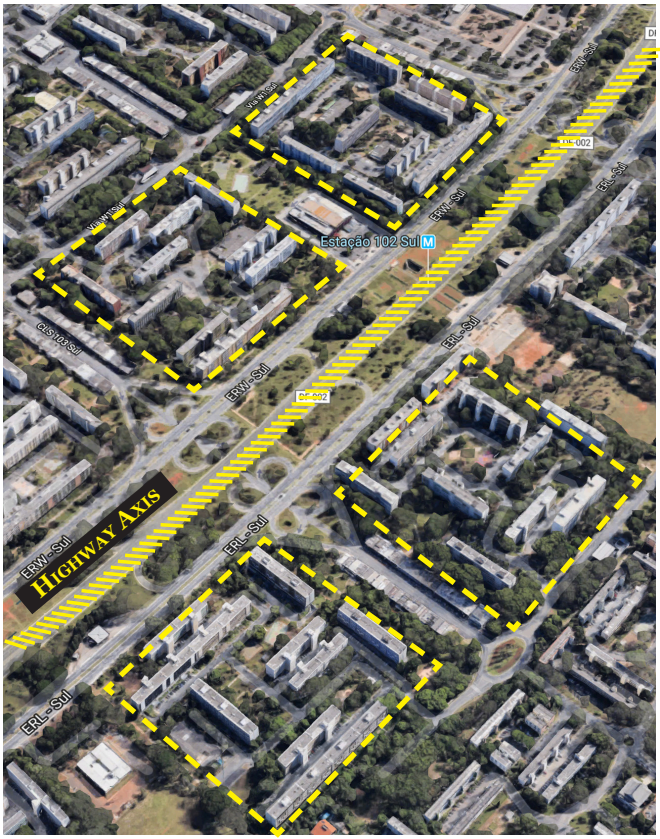

FIGURE 4
Satellite image of Brasilia's South Wing of the Highway Axis, highlighting four *superquadras*
source: Google Maps and author

FIGURE 5
A *superquadra* in the South Wing of the Highway Axis, obscured by greenery
source: Olhar Brasilia, 2017

Costa believed that according to the concepts of modern urbanism, the "city park" could only be achieved by the "incorporation of the bucolic into the monumental…the union of nature with urban life"[27]. A city that has one without the other would be incomplete. This blending of the manmade with the natural is an idea that Le Corbusier experimented with through his early commissioned houses and explored in Towards an Architecture (1923). The use of piloti and roof gardens blurred the line of where nature ended and the building began[28]. Costa attempted to achieve the same ambiguity with his greenery-cloaked superquadra.

As with most plans, that of Brasília's superquadras has been subject to changes made by inhabitants who found the plan unsuitable for their needs. The blocks on the South Wing of the Highway Axis were built first (for construction workers and engineers) and are more or less what Costa had intended. The greenery is lush, with a different tree in each block, and the local shops and restaurants are thriving. The changes that were made are few and innocuous: some residents converted the maid's quarters to an additional playroom, and the local shops reversed their layouts so the storefronts now face towards instead of away from the streets. The blocks on the North Wing, however, took longer to complete due to issues with the national budget. As a result, there are noticeable deviations, namely the relative lack of landscaping and strict regulation. The superquadras are more gray concrete than green leaves, and some of the newer blocks have added features such as underground parking and ground level entrances that undermine Costa's intention of a bucolic character[29].

Class equity was not a priority in Le Corbusier's A Contemporary City because the residential areas for the upper, middle, and lower classes were clearly separated. The upper and middle class residential areas were within the city limits, close to the center, while the working class was expected to live outside the boundaries and commute into the city[30]. Brasília, on the other hand, was based in more socialist ideology. Costa's original plan had all residents, regardless of socioeconomic status, living within the superquadras to minimize class distinctions. Unfortunately, the influx of migrant workers to the construction site of Brasília necessitated the creation of several satellite cities ten to eighteen miles away from the city center. The satellite city of Núcleo Bandeirante (also called Cidade Livre) was one of the first inhabitated by the laborors involved in the construction of Brasília (**fig. 6**). Though the cities were essentially shanty towns, the government hoped that they would eventually relocate to Brasília. However, Brasília lacked an effective low-income

FIGURE 6
Photo of the satellite city of Núcleo Bandeirante (Cidade Livre)
source: Cronologia de Pensamiento Urbanístico, 2015

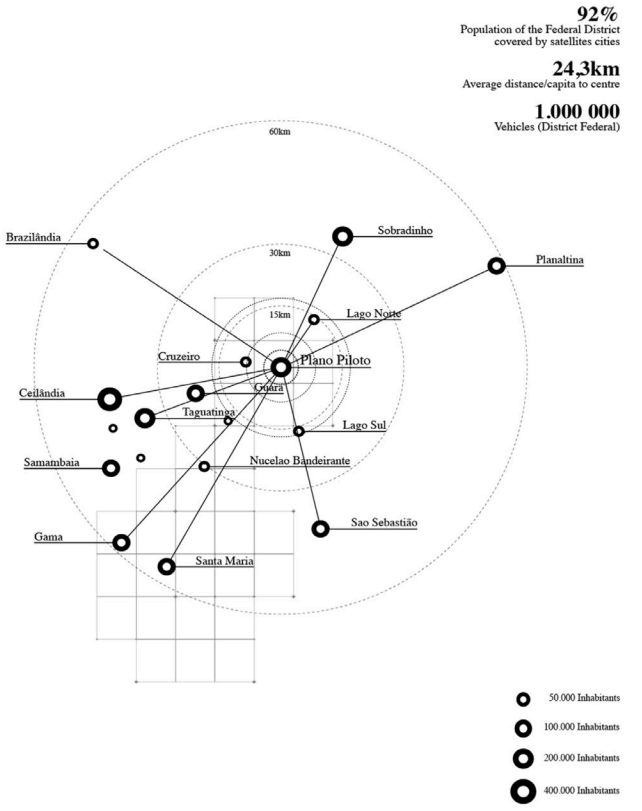

FIGURE 7
Diagram of the distances of the existing satellite cities to the capital Brasília and to Santa Maria
source: ETH Zurich, 2013

housing problem and the residents of these satellite cities remained there. Meanwhile, those at the opposite end of the socioeconomic spectrum were unsatisfied with their housing and set their sights on the attractive lakefront, even though Costa's original plan was to leave the area "unspoiled"[31]. These developments significantly disrupted Costa's socialist vision. Ironically, the end result resembles Le Corbusier's plan more than Costa's. The satellite towns, far from the capital, house the working class. The superquadra, once intended for persons of all classes, are inhabited primarily by the middle class, which consists of junior government and business employees. Finally, against Costa's wishes, the upper class built lakeside residences to escape the city. However, the satellite cities encouraged the development of the nation's interior, just as Kubitschek had promised. Today, many of these satellite cities have populations that rival that of Brasília (**fig. 7**).

W-3 Avenue and Pedestrians

The W-3 Avenue (**fig. 8**) runs parallel to the major roadway of the Highway Axis and prior to the 1970s, enjoyed great commercial and cultural importance. Its eventual decay illustrates the importance of considering the human experience and an individual's perspective when designing a city, an area where many modernists stumbled. Brasília wasn't conceived out of the needs of the people, but rather the visions of the government, and its plan reflected this inconsistency.

Costa's plan did not include a central commercial center because he intended each superquadra to have its own shops. However, a more centralized commercial hub developed naturally along the South Wing of the Highway Axis. The *superquadras* in this area were built to house the construction workers and engineers and thus, were the first permanent residences. A robut market for goods and services developed naturally and the W-3 Avenue served as a de facto commerial node[32].

In Costa's original plan, the W-3 Avenue defined the edge of the city, with residences to the east and orchards to the west. Almost immediately, the orchards to the west were replaced by three-story buildings, in which shops and offices occupied the first floor and residential apartments occupied the other two floors. From an aerial perspective, there is a clear difference between the *superquadras* to the east (which were part of Costa's original plan) and those to the west (which were constructed later due to rising demand). The commercial and residential activities developed a mutually beneficial relationship: as more *superquadras* were built and completed, commercial

FIGURE 8
Satellite image of Brasília, highlighting the W-3 Avenue and the Highway Axis
source: Google Maps and author

FIGURE 9
W-3 Avenue, South Wing of Highway Axis
source: Google Street View

activity surged and encouraged the construction of more *superquadras*. Over time, the charms of a one-sided commercial street (**fig. 9**) became inefficient and unsustainable[33]. The walking distance between destinations were twice what they would be for a two-sided street, and the lack of adequate shade made the journey a trek, especially during peak hours. The circulation of airflow was also poor due to the even heights of the buildings[34]. Aesthetically, a walk down the W-3 Avenue yielded an unpleasant landscape because both sides of the avenue were incompatible while the buildings on each side offered little variation due to excessive repetition of the same facades. Pedestrians were unable to orient themselves without sufficient landmarks, resulting in an uncomfortable ramble that seemingly never ended. Finally, the sharp increase in motorization rates resulted in a heavily congested and noisy street, especially during peak hours[35].

By the 1970s, the W-3 Avenue was already in decline. Local shops had begun abandoning the W-3 Avenue for more thriving commercial areas, and the inflow of new businesses was unable to counteract the outflow[36]. The W-3 Avenue illustrates the necessity of prioritizing the human experience in order to ensure the longevity of a street, a district, and even an entire city. Pedestrians are unwilling to patronize the shops along the W-3 Avenue because it is unnecessarily elongated, inadequately shaded, and particularly disorienting.

Brasília's Legacy

After a visit to Brasília during its opening ceremonies in 1960, John Portman came to the conclusion that architects were better off improving existing cities, rather than building completely new ones. He eloquently summarizes the glaring issues with Brasília:

> *"What an inhuman place! Nothing but great blocks of buildings arranged in military order. Some of the architecture is actually quite interesting but the buildings seen together become objects arranged in a sterile, two-dimensional pattern that shows no understanding of human scale or of the need for people to become involved in their surroundings. I found that after one look there was no desire to walk down the street, turn the corner, and suddenly discover something, because I already knew what was there."*[37]

Costa had converted to modernism to create solutions for Brazil's urban housing challenges, but this aspiration was eclipsed by the need to display the strength and vitality of the Brazilian government. Ironically, Le Corbusier's modernist principles – best exemplified by his plan for A Contemporary City – neglected the experience of the individual inhabitant. As a result, Costa's design for Brasília is more appropriate for a governmental campus than a thriving city. Brasília remains the national capital today, but is a far cry from the impressive and awe-inspiring vision that Costa, Niemeyer, and Kubitschek had intended due to its adherence to Le Corbusier's modernism.

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