URBAN MORPHOLOGY AND PUBLIC TRANSPORTATION SYSTEM: the segregation process in Goiânia, Brazil

AUTHOR:

Patrick Di Almeida VIEIRA
PPG/FAU/UnB , Brazil
e-mail: patrickdialmeida@yahoo.com.br

Valério Augusto Soares de MEDEIROS
PPG/FAU/UnB, Centro Universitário Unieuro and Legislative Analyst – Brazilian Chamber of Deputies, Brazil
e-mail: medeiros.valerio@uol.com.br

Abstract

This paper discusses how present day public transportation system in the city of Goiânia – Brazil, founded during the 1930´s at the heart of the country, can be related to the segregation process which excludes the lower social class from the urban core. It aims to explore the issue taking into account the investigation of configurational aspects, analyzed by means of Space Syntax or The Theory of The Social Logic of Space, compared with the public transport network data in Goiânia. The research considers the historical investigation of the city urban form in three distinguished periods: (a) the original conception of its pilot plan in the 1930´s, (b) the turning point during the 1950´s, when the city followed a Brazilian trend whose main feature was an unparalleled urban growth, which caused a fragmented and discontinuous urban grid, and (c) present day scenario, especially regarding the transportation system. In order to achieve the results, urban grid configuration shifts were faced with socioeconomic data and the main axes of the transportation system, intending to illustrate the close relation between the grid layout and accessibility patterns. Results pointed to a strong correlation between the public transportation structure and spatial segregation, an aspect which foster the interpretation of the spatial feature as a robust variable to maintain poverty ghettos inside the urban grid.

1.   INTRODUCTION AND GENERAL CONCEPTS

Goiânia was founded in 1933 as part of a unique Brazilian experience in structuring the national territory from planned capital cities – Teresina, Aracaju, Belo Horizonte and Brasilia are examples of the same premise. The city was designed to house a population of fifty thousand inhabitants, however, over the years, was subject to a gradual growth, reaching 1.302.001 residents[1] in the beginning of this century. The expanding population converted to urban expansion, apparently not followed by a consistent overall planning – that is, always considering the relationship between parts of the city – contributed to the formation of what we call a "deconstruction" of the spatial arrangement implemented by the original plan. Currently, the complex unarticulated structure of the capital of Goiás challenges administrators and scholars.

Despite the contemporary context, in order to organize this somewhat unexpected growth, Goiânia had five master plans throughout its existence: the first, completed and inaugurated in 1938, was initially developed by the architect Attílio Correia Lima between 1933 and 1935; the second was not official, it from 1959 to 1962, and its applicability and effectiveness could not be verified due to the political instability at the time immediately preceding the 1964 military coup; the third was designed 1967 to 1979; the fourth was prepared between 1989 and 1992; and the fifth official plan came into effect in 2007, and is currently in force.

In order to better understand the relation between the various master plans and the actual creation of space of the city, we can use the periodization by Sérgio Moraes and from the Integrated Development Plan of Goiânia - PDIG[2] - allowing the division Goiânia's development in four phases (Morais, 1991):

- 1933 to 1950: creation of the place;
- 1950 to 1964: growth of the place;
- 1964 to 1975: the concentration of places in the space;
- 1992 to the present: segregated urban spaces.

Even today we can detect important traces of the territorial structuring of the city from the early decades, with certain variants arising from its original master plan. However, it is clear the participation of the real estate developer in the formation of the urban structure, especially after 1950. Following the model studied by Villaça (2007) called circle of Hoyt – to define and describe the types of physical structures of cities – Goiânia can be classified as a metropolis of the interior, since it has 360 degrees to develop. The site of the young capital allowed the settlement to develop in all directions even if, in its initial phase, the intention was that the city would develop in the first six years to the north and, after that, to the south. The choice of these two axes was made because those were the lands that were purchased by the state.

About fifty years later, Goiânia is still divided between north and south. The north – northwest region, to be exact - is identified as being ill-equipped and inhabited by the most impoverished stratum of the population; in stark contrast with the south-southeast, which was the expansion of higher-income strata.

The social-spatial segregation between the space inhabited by the richest and the one inhabited by poorest is a characteristic feature of Brazilian urbanization, accentuated greatly during the period of conservative modernization promoted by the state from the 1930s on.

---

[1] According to the IBGE's (Brazilian Statistics Institute) research in 2010.

[2] SEPLAN (Planning Secretary), Goiânia, 2000.

Until about the mid-1950s, the formation of the urban space in Goiânia respected the original plans and the growth was ordered by the state. There was a strong influence of the developmental thinking originating in the 1930 movement that was responsible for the construction of the city and the consequent transfer of the capital, reaching 53,000 inhabitants by the end of this period. It is inferred that until the 1950s the urban fabric produced was not of great fragmentation, since the expansion was compact and respected the original design of the project, as it was previously mentioned. The problem of fragmentation and segregation occurred more strongly from the 1960s on and deepened in the 1980s with the northwest-southeast orientation of the city and the expansion of the urban voids.

Medeiros *apud* Assis (2008) explains that Goiânia's settlement has a quilt pattern, characterized by neighborhoods whose street design does not articulate with adjacent sectors, nor with the other parts of the city. The lack of connectivity or articulation accentuates the degree of spatial segregation, which tends to have a strong relation with the social segregation. The design of the neighborhoods, in this case, makes it all the mores difficult for people to move throughout the city, not so much in the city core, but more so in the city's fringes.

Such characteristics can be better observed and understood through an investigation of the geometrical organization of the space of the city of Goiania. This can be done by contrasting its planned and integrated central region with the location of its most segregated areas, over each historical period, marked by the phases of urban expansion and the succession of each respective official directive plan. Such analysis is not only geometrical but also topological, which means that it takes into account the relations and hierarchies that exist between the parts of the city, based on the aspects of urban morphology.

Medeiros (2006) states that "the researches about Brazil's urbanization process are extensive and rest in several focuses. Traditionally, the look over cities is temporal, in a historiographical and artistic or social perspective, focusing on the economic disparities translated in spatial segregation or integration. Even when investigating the configuration of cities, little attention is dedicated to the inter-part relational aspects, prioritizing local and geometrical features". Such statement is anchored in what Holanda (2002) says about the contribution that the architects can give to the study of cities,that is, taking into account the morphological aspects.

Having this particular approach in mind, which aims to systematically understand the city, analyzing it as a system of intertwined relations, the article seeks to answer a central question: does the current public transportation system of the city of Goiânia makes the integration of the most impoverished strata to the flow of employment and income easier or more difficult? In order to answer that, this paper shall take into account configurational aspects, based on the Theory of Social Logic of the Space (Space Syntax), as well as the structural aspects of its mass public transportation network.

2.   METHODOLOGY

Space Syntax presents a set of methods and tools to explore the configurations of the constructed space, be them buildings or cities, based on the theory that relates space and society, originated in the Bartlett School of Graduate Studies (University College London), in the 70s. This theory is based in two ideas which attempt to translate the objectivity of the space and our ways of interacting with it. The first idea is that the space should not be taken as a simple inert element where we operate our existence. On the contrary, space is strictly connected to the social relations and its performance, especially considering the human strategies to

move through space, interacting with other human beings. It starts from the principle that the movement is essentially linear and that interaction happens in convex spaces in which one can see and be seen from all points.

The second idea is that space acts not only over the properties of the individual spaces, but also over the interrelations between the many space that make up the spatial arrangement of a city or a building. To this, we give the name of space configuration and that means the existence of relations between the parts that make up the whole, whose global properties are not obtained by the sum of the analysis of the parts.

With respect to the methodology, the following steps are adopted, in association to the configurational aspects:

a) Historical and documental method – bibliographic research: it comprises the investigation of bibliographic references, documents, happenings, processes and institutions, in order to identify the phases of the development of the city of Goiânia. References about the spatial configuration and of how society has used the urban space are essential for obtaining the historical references about a society. It will be valid for the grounded comprehension of the forces that have molded the current Brazilian spatial configuration and the situation of the cities in the contemporary world.

In order to better understand the universe chosen, a survey on information about the growth and the ordering of Goiânia was carried out, through primary sources such as public and private archives, official statistics, census; and secondary sources, such as other works, magazines and newspapers.

b) Syntactic-spatial methods:

The specific methods of the Space Syntax are also used, based on the previous information. The tools called axial maps are used, which have the values of integration (an indicator which enables the reading of the relations of the urban form, from the degree of accessibility through the permeability of the elements that compose the urban system). Such integration values can be presented in a chromatic scale, in a way that the most integrated axis, the more accessible ones, are assigned a color which tends to the hot end of the scale (red, orange, yellow), while the more segregated axis are represented in a scale of cold colors (dark blue, light blue and green). There are specific softwares for calculating the integration values, which allow the realization of the procedures (Depthmap and Mindwalk).

c) Reflexive and interpretative phase:

After the collection of data and the organization of the material available for a proper characterization of the object of study – Goiânia – and the learning of the specific techniques of the theory of Space Syntax, the analysis itself was carried out, based on the question of the research.

3. ANALYSIS AND GENERAL RESULTS

3.1. Configuracional Urban Evolution

Studies carried out round the world suggest that there is an important relation between the morphology of a certain city and the socio-economic conditions of its inhabitants. Poverty in big cities is a theme that imposes constant challenges for the government and for the researches of cities everywhere. Recently,

research about space syntax raised the question about the spatial component of poverty. In the specific case of the research conducted by Professor Laura Vaughan (2005) from the University College London (UCL) about persistently poor regions in the English capital, the study seems to point to a straight correlation between what the author has called social deprivation and the distance from the residences and the region where the jobs are located. The author suggests in her study that there is a relation between the economic and spatial segregation, making such regions more prone to poverty and poverty persistence.

Due to restrictions in the number of pages, the present paper will focus on the particular aspect of the integration of the urban grid of the city and the structure of its transportation system.

The initial plan, resulting from the sum of the works of Corrêa Lima and Godói, was made official in July 31, 1938, and had its efficiency and applicability made feasible up to the early 1950s, except for the occupation of the eastern part of the city, inhabited by the workers who built the city and which should have been temporary, but became permanent and was regulated between 1947 and 1954.

Since it was made official and during all the period of the *Estado Novo*, the first plan was respected as a real instrument of occupation and growth of the city, and the public administration was able to curb the real estate speculators in Goiania, holding the control over the land use. Figure 1 presents the configuration of the original core of the city as a well-integrated system, considering the planned core.
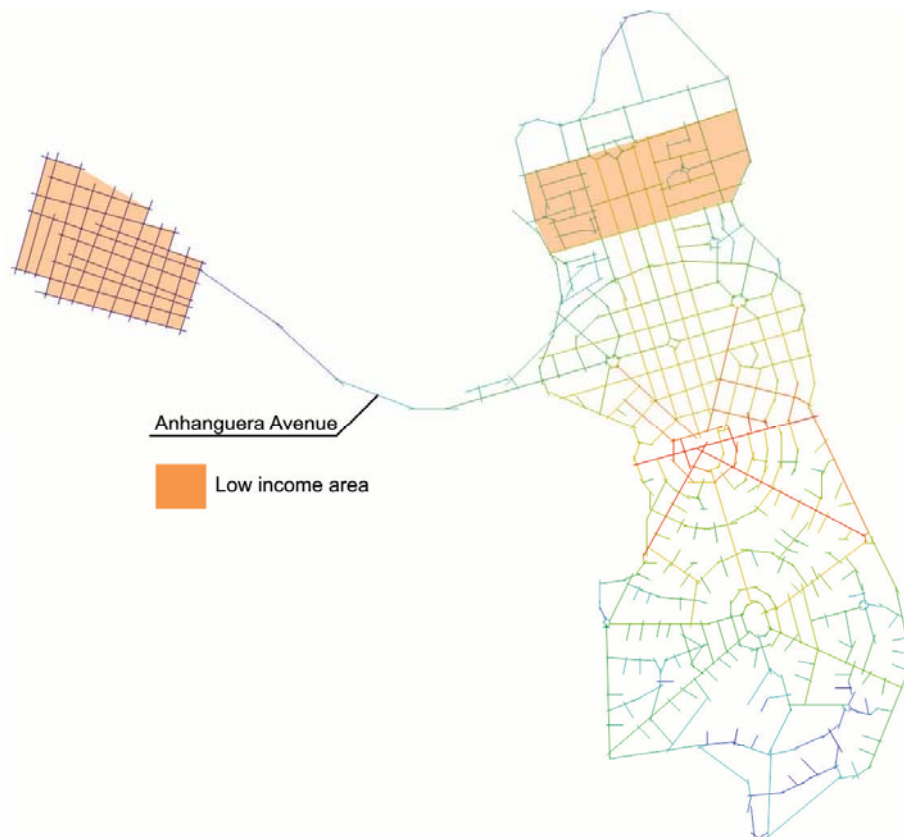

Figure 1 – Axial Map (Rn) from the original core of Goiânia, as executed in the 1930s. We can see low income areas within the pilot plan. Average Integration: 0.840.

Nevertheless, the pressure exercised by the owners of large plots of land grew. Part of the land owners in the region who had made some of their land available for expropriation and donation at the time of the

construction of the new city, reserved other pieces of land, later incorporated to the surroundings of the pilot plan, thus controlling the real estate market. The pressure exercised by the developers also grew. Even then, in the 1940s, the government was still the only one responsible for the gradual expansion of the urban fabric. Figure 2 shows the incorporation of new developments to the original core, but which still do not compromise the global integration of the whole.

Thus, in the early 1950s, the government gave in to the private initiative, pressured by the land owners from the surroundings of the urban zone and by the real estate speculators. From then on, the city grew in geometrical progression, going through a demographic explosion which altered its original plan.

This is all the more clear if we notice that, since its creation until 1947, the urban development was an exclusive prerogative of the government.

In the end of the 1950s, the city was completely disfigured in relation to the original project, with its central areas all in the hands of private owners, the developments increasing in number at a surprising rate, casting out the most impoverished stratum of the population, or leading them to occupying public areas.
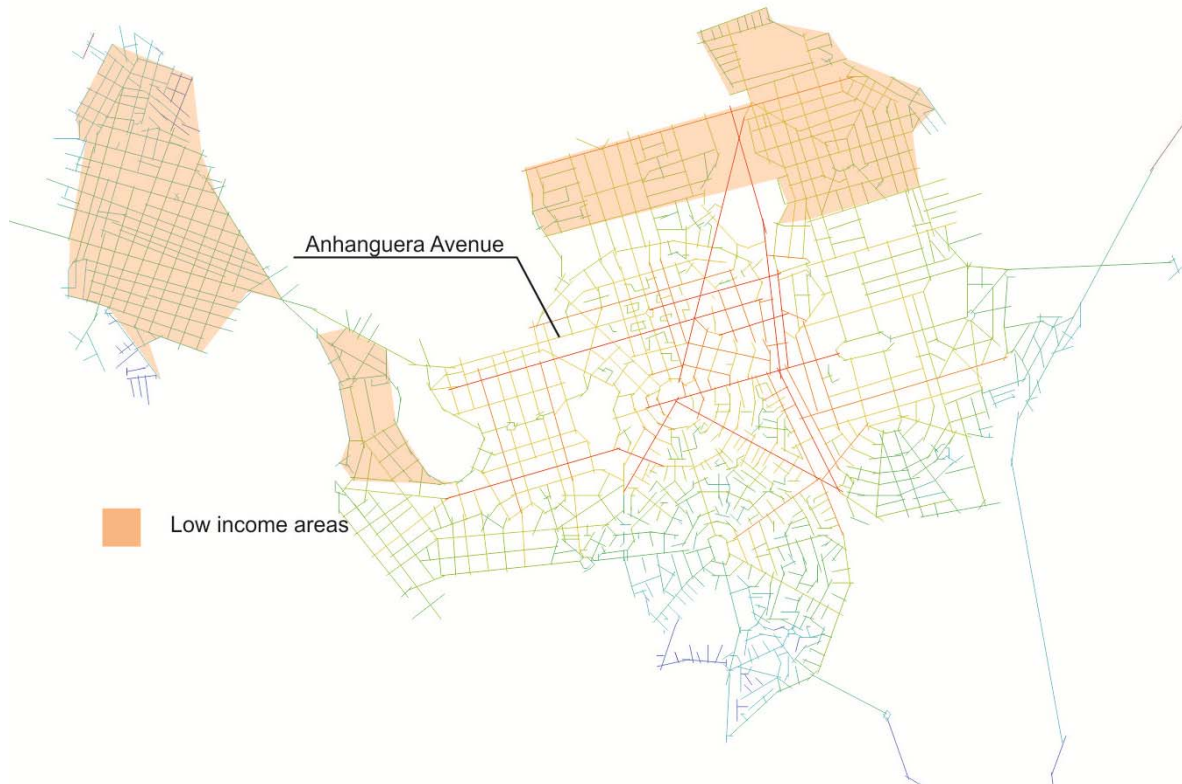

Figure 2 – Axial Map (Rn) of the initial core of the city and its first controlled expansions, in the 1940s. The low income areas still are close to the city centre. Integration average: 0.954.

Goiania then embraces a profile of frontier city. The growth in this period was vertiginous, reaching from 9,69% to 10,96% a year. In 1960, the city went from 150.000 inhabitants, 133.462 of which in the urban area, to 260.000 inhabitants 1964. From 1950 to 1964, 183 developments which did not comply with any technical criteria were approved. The integration index decreased sharply, demonstrating the low connectivity between the new settlements approved. In these new developments, there weren't enough green areas, the few existing ones being confined to small central squares and the protection areas near

creeks were not respected. Many times, the plots of land had its limits in the river bed. The situation was further aggravated by the lack of articulation between one development and the other, which created great urban voids, once the market greed was the only orientation behind the occupation of the territory. The obligation to implement basic infra-structure to the new developments was suspended, which resulted in the approval of a great number of developments like this, as well as disorganized constructions made with no restrictions, be them industrial, commercial or residential. In this scenario, by the late 1950s and the early 1960s, a new plan was elaborated

This plan was not officially implemented due to a series of political conflicts experienced at that moment in Goiânia. In light of the Brazilian political scenario, the state government was the administrator and controller of the city, despite the fact that there was a municipal government which opposed it and demanded to itself the *de facto* and rightful functions of the capital's administration.

The poor population came into conflict with the real estate developers, who lead them to residential places in distant areas, without occupation or public services and urban equipment, thus becoming marginalized. This population was forced to a long daily commute in order to go to work, because the employment and income opportunities remained in the central area of the city. When faced with the great voids which existed between these two realities, the population began to pressure for its occupation. The scenario resulted in a disturbance of the *status quo,* although the elite still held on to the view of progress and dynamism, once the city grew very fast.

In this scenario, the young capital of the state of Goiás found itself ill equipped to endure the stark growth it was facing. The few existing urban planning guidelines did not account for the city that really existed. A new plan was needed, capable of accounting for the development of the urban fabric and preparing the city for the establishment of a new public transportation system which served the city as a whole, accentuating its integrating character.

The official story says that a new plan was only implemented in the end of the 60s. Due to the need of solving the flow demand and the urban disorder, this new plan was developed between 1967 and 1968, and handed in 1969.

In order to make this plan in accordance with regulations, a new law was issued, enlisting a number of urban infra-structure demands which would be at the developer's expense, making new developments virtually unfeasible, although not forbidden. From then on to the end of the 80s, irregular and clandestine developments began to appear – in a total of over 70 – not following any technical criteria nor seeking approval from the municipal government, which greatly contributed for the disorganization of the urban space.

Several other developments also appeared in neighboring smaller municipalities, such as Aparecida de Goiânia. Once again, the city was disfigured, only this time the disfiguration went beyond the city itself, reaching its surroundings. Figure 3 presents a greater density in the outskirts of the city, with neighborhoods already implemented along the roads leading to surrounding cities becoming increasingly more populous and in need of integration with the rest of the city. The integration level measured through the axial map is even lower than the previous one.

In the context of this plan, two new laws of land use were elaborated. The first one, in 1975 emphasized the street system and the public transportation, valuing also the residential projects. In practice, this law made urban life more severe, by liberating the number of floors on buildings, which in turn led to a collapse in

several neighborhoods of the city that had not been planned to receive such a load of high rise buildings and population.
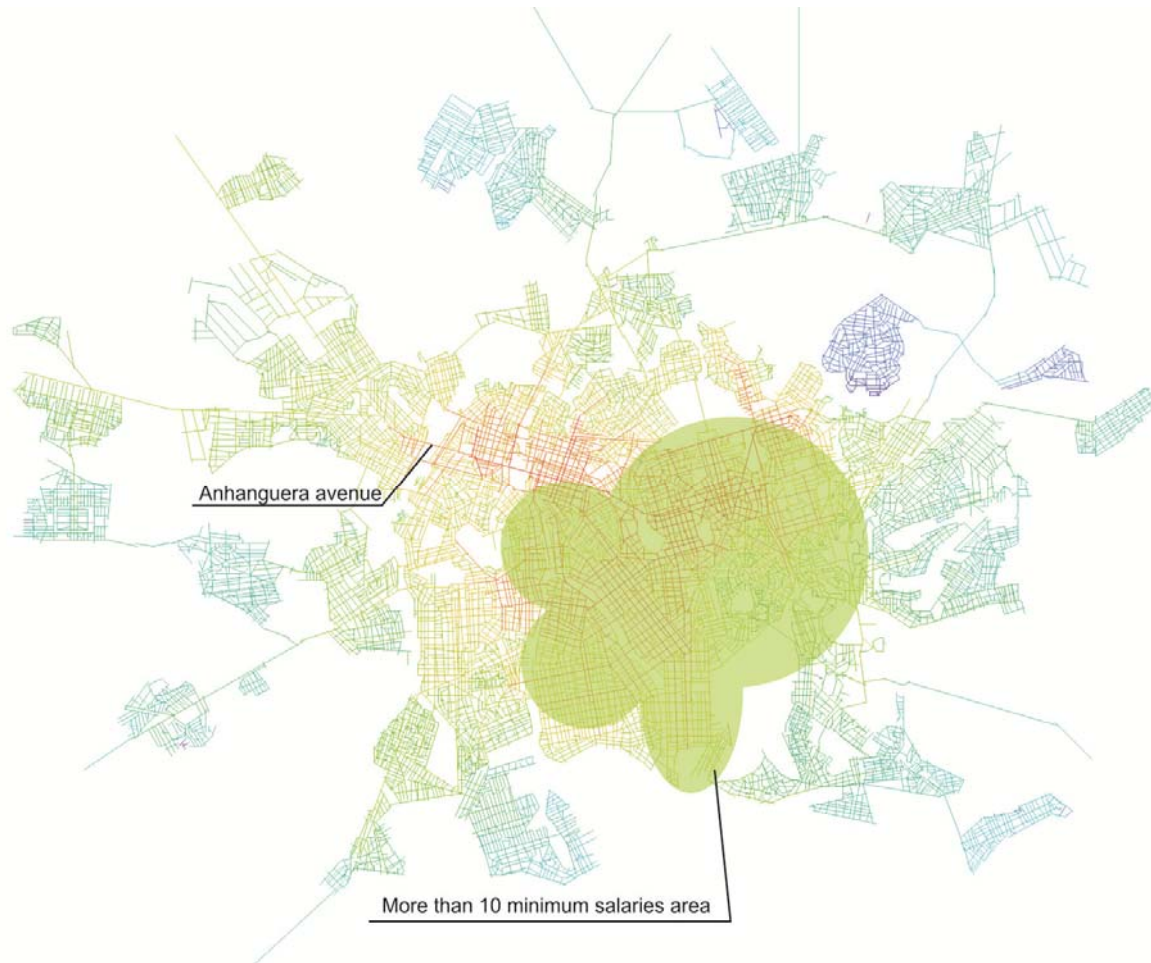

Figure 3 – Axial map of Goiânia (Rn), in the 1970s, at the time of the implementation of the Integrated System of Urban Transportation. The high income area occupies the South zone of the city. Integration average: 0.598.

In an attempt to minimize the effects of the previous law, the second law on land use, from 1980 imposed strong restrictions of use in all urban areas, with the aim of curbing and forbidding the pernicious effects of demographic explosion, urban sprawl and territorial speculation. It is important to highlight that while this plan was underway, the city's growth decreased progressively (although it was still expressive), reaching, by the decade of 1970s, the rate of 6.54% a year and, in the 1980s, 2.29% a year

3.2. Discussion About the Transportation System

It seems appropriate to refer to Villaça and to his discussion about the structuring of the urban fabric being "overcome by the displacement of the urban being, as a bearer of merchandise and work force, or as a consumer" (Villaça, 2007).

For Villaça (2007), "the displacement conditions of the human being, associated to a specific point in the urban territory took precedence over the availability of infra-structure in this same point. Accessibility is more vital in the production of locations than the availability of infra-structure". The author explains that the several produced urban objects can only be explained if their location is taken into account and the location is in itself a product of the work and it is what specifies what the author calls intra-urban space. The worker is naturally led – to use his terms – to follow the money and, for such, demands the urban transportation of passengers; at the same time, it is subject by the people who hold the money, in the class struggle which disputes the best space in the city. In this struggle, the worker fights – and is defeated – by the proximity to the job and the reduction of time and cost of displacement in the commute from home to work.

Besides this aspect, it is necessary to point out for the location of the proletarian streets in relation to the location of this same transportation or, in other words, analyze the configuration.

Until the 1960s, the bus lines and the schedules in the public transportation of Goiânia were organized or altered aiming only the maximization of profit to the managing companies, at the expense of the needs of the users.

The general panorama of the structure of the public transportation system, in this period, was the worst possible: it was comprised of a fleet of old and constantly damaged vehicles, the number of trips was not able to supply the demand, the routes and schedules were not regular and the roads were in terrible conservation state, most not being paved or fit for traffic.

Despite the limitations described here, it was only after the directive plan approved in the early 70s that Goiânia began to prepare for the implementation of a mass transportation system. This new system was thought of to serve, at least minimally, the needs of displacement of the working mass residing in the outskirts, to the center of the city. The increasing and faster development of the work market and of the money flow imposes to the administrators of the city the investment in structuring a network of bus terminals and the adaptation of some streets to receive a bus exclusive lane, in regular and fixed lines. It is in 1976 that TRANSURB – Urban Transportation Company of the State of Goiás - is created. The company is considered a landmark in the history of the public transportation system of Goiânia. The new transportation system had the direct participation of the private initiative, through the summons of all companies which operated the bus lines which served the city at that moment.

The phase that came after TRANSURB brought significant improvements to the whole system. The Integrated Urban Transport System was implemented, along with the integrated ticket. With new lines, numerous streets were paved in order to make easier access of the busses to the most recent neighborhoods and routes.

The Integrated System also allowed for a great decentralization from the downtown area, once several lines would connect the more distant neighborhoods only as far as the new buses terminals, and these to the city core, using the integrated ticket. In turn, this contributed to a decrease in traffic jams in the area around the central neighborhoods. Such changes lead to an increase in the number of users, which went from 280.000 passenger/day in 1976, to 360.000 in 1977 and 415,000 in 1978[3] (Figure 4).

---

[3] According to the SEPLAN (*Planning Secretary*).

Currently, there is a more recent integrated transport system in place, created in the year of 1984. It is formed, as seen in Figure 5, by 10 integration terminals, mainly structured in two axes: *Avenida Anhanguera* (east-west) and *Avenida Goiás* (north-south). The system is made up of 190 bus lines which are organized in trunk axes, integrated feeding lines, direct lines, circular lines and inter-municipal lines (which serve the urban agglomeration) distributed among the several companies which operate the system.

The trunk lines make the connection between the terminals, going through very busy zones. Currently, there are 14 trunk lines and the Anhanguera axes is the main representative trunk of the system, with its total length (13,5 Km) in a segregated central lane for the busses, containing 5 out of the 10 terminals of the transportation system of Goiânia. Since the beginning of the implementation of the mass transportation system, Anhanguera Axis takes the role of the articulating axis within the system for being located in one of the shallowest avenues of the urban system. In the jargon of Space Syntax, the terms "shallow" or "symmetric", as Holanda explains, "are found in the literature as synonyms of integrated, whereas the term "deep" or "assymetric" are synonyms of segregated" (Holanda, 2002). Anhanguera Avenue has always been one of the most integrated avenues of the whole system, since the construction of the original core of the city. In the 1980s, when the integrated transport system of Goiânia was implemented, as seen in map 4, the Anhanguera Axis presented an integration index of 0.97, in comparison to an average integration of 0.62 of the urban system as a whole. Thus, it is not by chance that half of the terminals in the system are found along its extension.
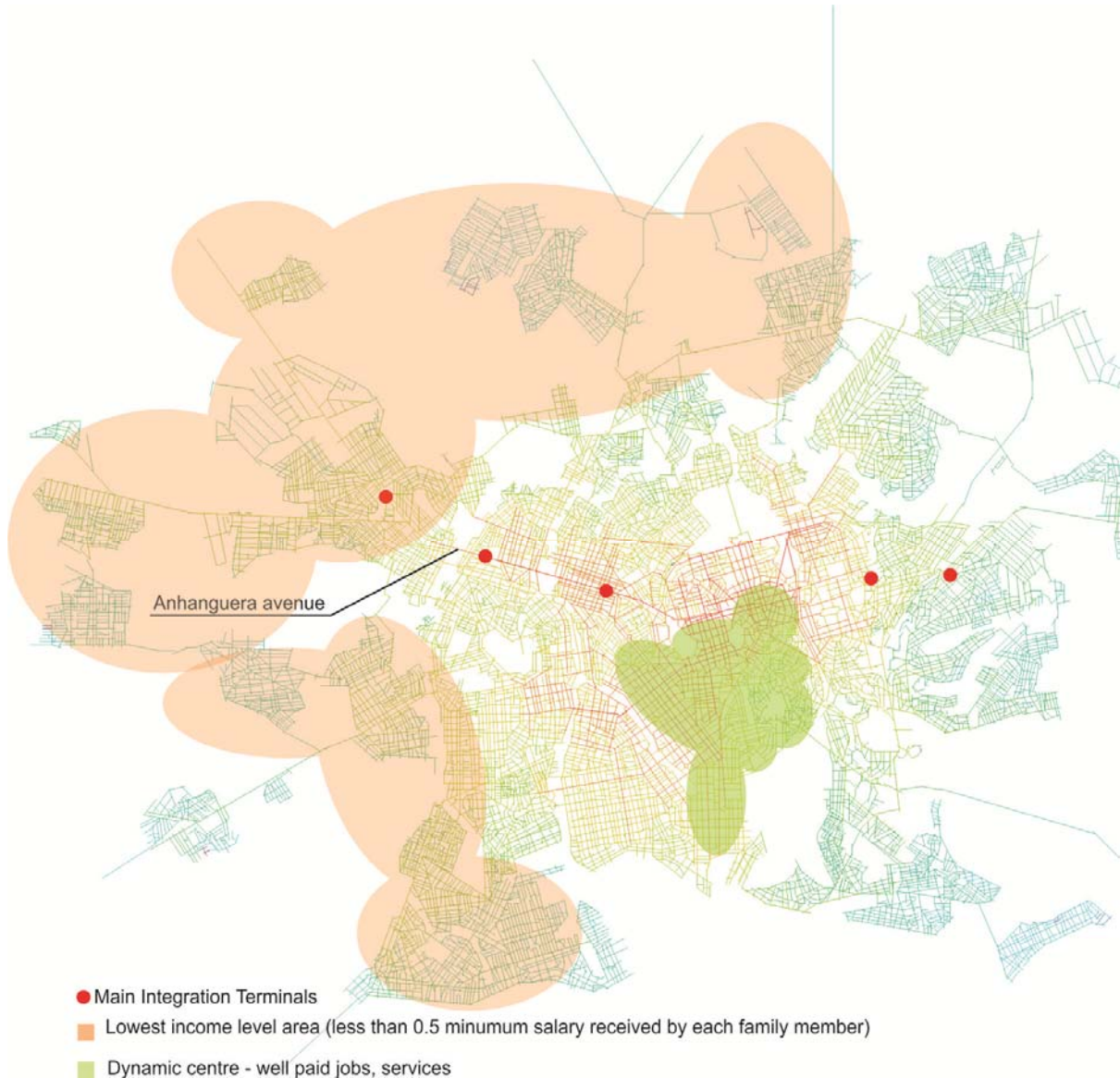
Figure 4 – Axial Map of Goiânia (Rn), in the 1980s, at the time of the implementation of the first Integration Terminals. Integration Average: 0,621

The feeding lines make the connection between the neighborhoods to the ten bus terminals, operating in 122 segregated lines. They also have a very intense volume of passengers, especially in peak times. Some of these lines are connected to the municipalities of Goiânia's Urban Agglomeration and have a different ticket price.

The direct and circular lines operate throughout the city with 38 direct lines and 6 circular lines, connecting the neighborhoods to the center, the terminals to the neighborhoods, or the neighborhoods to one another. The circular lines go around the city in a circle. The direct lines go from one point to another, without returning to its initial point to complete its route.

The integration terminals are closed and enable the passengers who get off the bus inside them to have free access to another bus inside the terminal. However, people who live in the vicinity of the terminal may go in by paying the ticket at the entrance. The terminals work also as a checkpoint for controlling the lines that go through them. The system is comprised of ten terminals: *Izidória; Bandeiras; Vila Brasília; Cruzeiro do Sul; Balneário; Novo Mundo; Padre Pelágio; Dergo; Praça A; Praça da Bíblia,* being the last five along Anhanguera Axis.
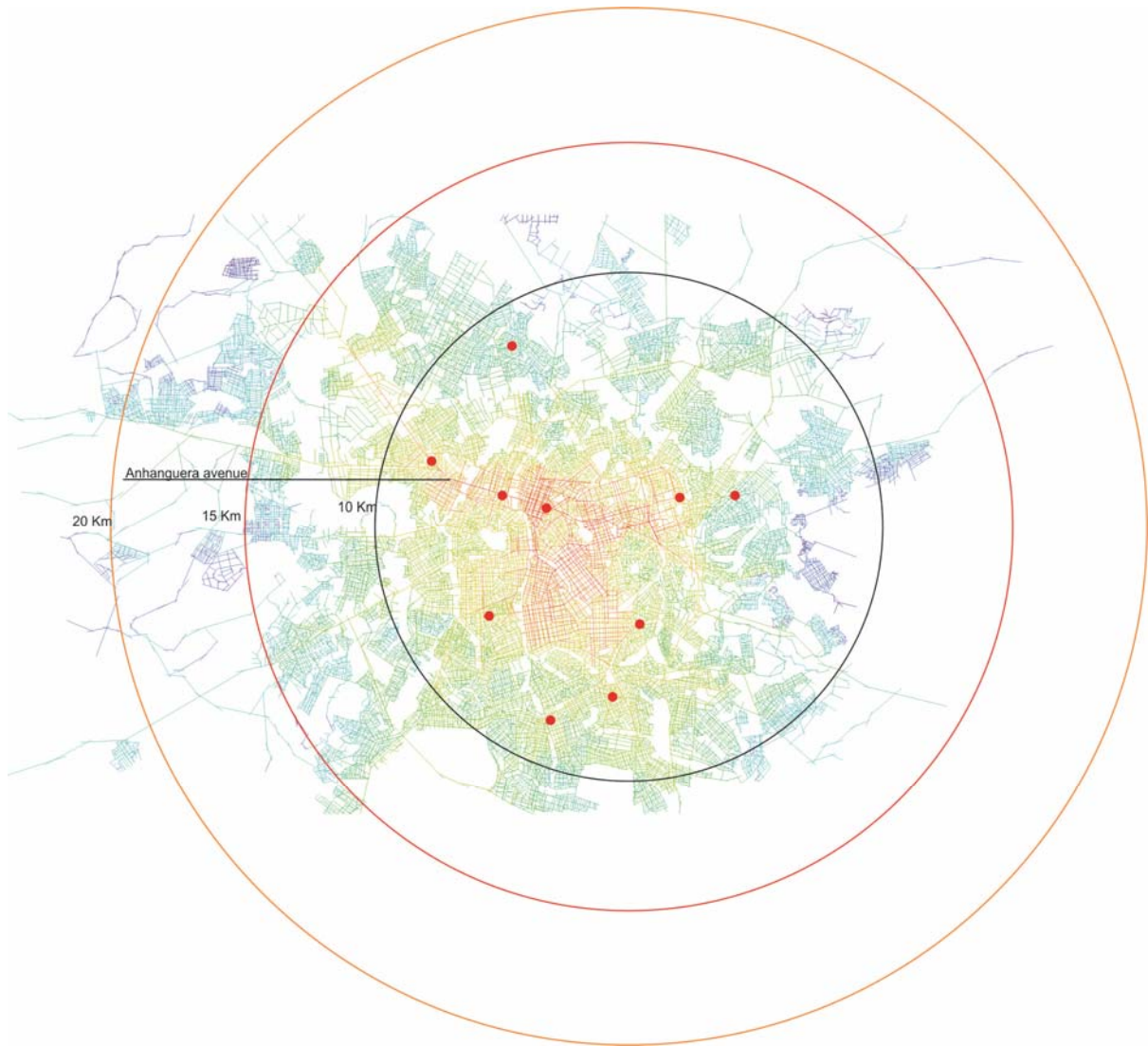

Figure 5 – Axial Map of the current Metropolitan Region of Goiânia (Rn). The Integrations Terminals are plot in red. Integration average: 0,606. Source: Leyla Alarcón and Valério Medeiros.

3.3. Spatial Segregation

We can easily see, through the several axial maps which illustrate the evolution of the urban space configuration of Goiânia, that the integration average of the time when the urban expansion was exclusively in the hands of the government authorities was relatively high: 0.804 in the 1930s; and a bit higher in the 1940s – 0.954 –, due to the low fragmentation of the urban fabric and a better incorporation of the street network of Campinas to that of Goiânia.

After the mid-1950s, with the consolidation of the private entrepreneur over the State, the integration average suffered a strong decrease, of about 36.7%. The integration average of the Metropolitan Region of Goiânia today is not very different of that of the 1950s, at 0.606.
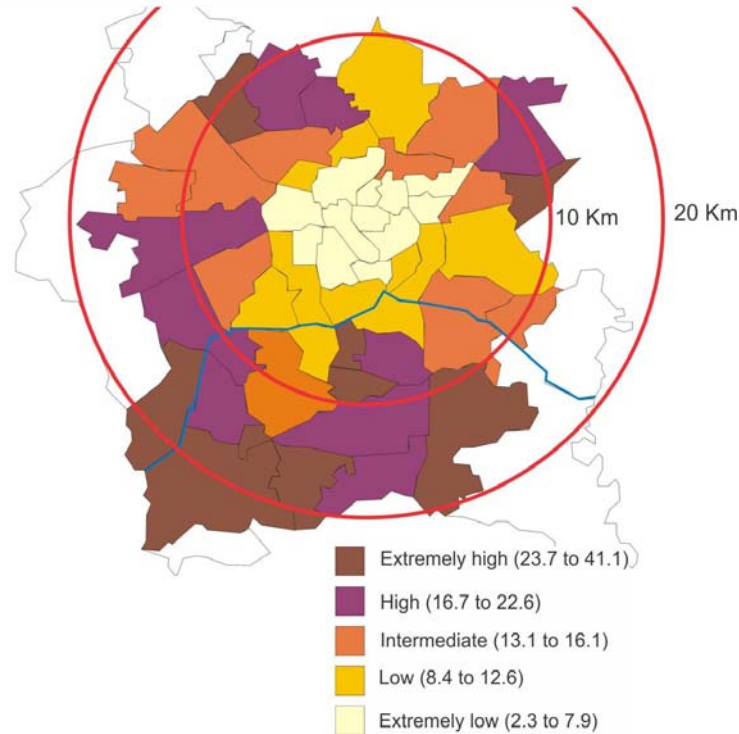

Figure 6 – Percentage of families that live within 0.5 minimum salary per capta. Source: Observatório das Metrópoles (Metropolis Observatory)– IPPUR/UFRJ/FASE – 2000

It is important to highlight that Medeiros (2006) explains that the Global Integration – Rn – "translates how accessible or permeable a certain line is in a linear representation". Such value is found taking into account the connections present in the street network and the routes which can be made with this same arrangement. Medeiros (2006) teaches also that "a more integrated street is the potentially more accessible or permeable one, in terms of hierarchy. It means it is easier to reach this street from any point in the city". According to him, the integration values are normalized which means that systems which are in principle totally different may have their values compared, and this is useful to enable the classification of the permeability of several cities. As it was previously mentioned, Goiânia is not very permeable, due to its quilt pattern.

Thus, we notice that the integrating core of Goiânia's metropolitan region, taking into account here only the more strongly integrated streets represented in red, is small if compared to the whole urban agglomerate and that only three of the integration terminals are incorporated in it: *Padre Pelágio, Dergo* and *Praça A*. The other terminals are found in deeper areas of the city, although not in regions with integration values below the average of the city as a whole.

We can also notice that the trunk axes – those which most strongly structure the system and that go through the poles which generate a greater number of trips – are found, in most part, in places with a low (8.4 to 12.6%) or very low (2.3 a 7.9%) percentage of families who have a per capita income of up to half a minimum wage. This can be seen in the map that shows the location of the integration terminals (Figure 5), and Figure 6 which refers to the percentage of families with per capita income of up to half a minimum wage. Such situation shows that the families with lowest per capita incomes and which are found in the deepest segments of the spatial arrangement of the city of Goiânia, are exactly the ones with less access to the structural axes of the public transportation system. Thus, the members of these families find the strongest obstacles in order to integrate themselves to the productive circuit, which in large cities invariable goes through an individual's capacity of moving around, especially the ones with the lowest incomes who tend to live further away from the places that generate employment and income.

Another important datum is that, when analyzing the map from Figure 5, we notice that the spatial arrangement of the trunk axes of the public transportation system resembles the most integrated part of the urban grid of Goiânia. The red and orange streets (which are the ones with the highest integration index) go through a region which, generally speaking, comprises part of the trunk axes, benefiting most effectively a population which is already in the most integrated region. The population outside the integrating core and its vicinity would thus find much more difficulty in accessing the terminals, which are placed in the regions of high concentration of jobs and high flow of money.

## 4.	CONCLUSION

From this brief study we can conclude the following:

The evolution of the design of the city of Goiânia, from the 1930s to the first decade of the 21st century, analyzed through the axial maps, allows us to vividly notice the inflexion which took place in the mid-1950s, when the State is replaced by the private entrepreneur as the main inductor of land occupation. Until then, the average integration of Goiânia presented a value similar to those found in cities with a grid pattern. It is important to make clear, however, that the grid present in the original plan of Goiânia presents great distortions in its configuration. The private entrepreneur bent the legislation in accordance to their own market convenience. This fact will create a city full of urban voids and consequently, greatly fragmented and deeply segregated, with a clear distinction in the ability of accessing the whole urban system between the poorest and the richest.

The comparison between the axial map of the metropolitan region of Goiânia, the maps of the trunk axes of the public transportation system and the location of the integration terminals, and the map of per capita income shows that it is possible to infer that the current configuration of the transportation system makes it more difficult the integration of the lower income population of the metropolitan region to the region of better flow of money. Few terminals are located in the city's integrated core, the trunk axes do not go into the deepest and most impoverished regions, which forces the inhabitants of the least accessible regions to cross longer distances, spending a longer time and going through less important lines, in order to access the city's most strongly articulating transport system.

The data collected here point to a strong correlation between the structure of the public transportation system of Goiânia and the difficulties faced by the lower income population to access the region which

concentrates jobs and income, which may lead to the inference that there is an inherently spatial component in the maintenance of the poverty ghettos in the outskirts of the urban grid.

Despite the analysis presented here, it is important to highlight that the Space Syntax, as a research methodology, studies the relations between the architectonical configurations (of buildings or urban systems) and the social systems.

Holanda refers to the coherence between architecture and society, but points out that although there are historical evidences of such relation, "speaking of coherence is not speaking of a biunique determination between architecture and behavior, but it is recognizing that architecture creates a field of possibilities and restrictions; possibilities which may or may not be explored and restrictions which may or may not be overcome" (Holanda, 2010).

This way, it is clear that we are not talking about determinism, that is, the fact that these families find themselves spatially segregated from the trunk axes of the transportation system does not automatically condemns them to economic misery. It shows, however, data which can help understand the mechanisms of maintenance of urban poverty and the need to investigate further their corresponding spatial component.

5. BIBLIOGRAPHY

ALARCON, Leyla E. L. *A centralidade em Goiânia.* Brasília, 2004. Dissertação - Programa de Pesquisa e Pós-Graduação da Faculdade de Arquitetura e Urbanismo da Universidade de Brasília.

ASSIS, Deire. *Uma cidade com jeito de labirinto*. O Popular, Goiânia, 22 Dezembro 2008, p.4.

HOLANDA, Frederico de. *O Espaço de Exceção*. Brasília: Editora da Universidade de Brasília, 2002.

HOLANDA, Frederico de. *Brasília. Cidade moderna, cidade moderna*. Brasília: FAU UnB, 2010.

INSTITUTO DE PLANEJAMENTO MUNICIPAL. (1992). Plano de Desenvolvimento Integrado de Goiânia.

MANSO, Celina F. A. *Goiânia – Uma concepção urbana, moderna e contemporânea – Um certo olhar*. Goiânia: Edição do autor, 2001.

MEDEIROS, Valério A. S. de. *Urbis Brasiliae ou sobre cidades do Brasil.* Brasília, 2006. Tese – Programa de Pesquisa e Pós-Graduação da Faculdade de Arquitetura e Urbanismo da Universidade de Brasília.

MORAES, Sérgio. *O Empreendedor Imobiliário e o Estado: o processo de expansão de Goiânia em direção sul* (1975-1985). Dissertação de Mestrado, FAUNB, 1991.

SECRETARIA DE PLANEJAMENTO MUNICIPAL. *Plano de Desenvolvimento Integrado de Goiânia. – PDIG 2000*, 1992.

VILLAÇA, Flávio. *Espaço Intraurbano no Brasil*. São Paulo: Studio Nobel, 2001.

VAUGHAN, Laura. *Space and Exclusion: Does urban morphology play a part in social deprivation?* Area, 37 (4). pp. 402-412, 2005. Available at: http:// eprints.ucl.a.c.uk/cgi/search.