Praxeology and Space Syntax: An epistemological articulation in favor of urban mobility as human action

Paranaiba, A.C

Abstract
The purpose of this paper is to identify epistemological possibilities of application of Praxeology as a method for studies that aim to bring solutions to urban mobility. Currently, urban mobility is under the centralized planning that wants to provide the public transport that offers the best value for money for the citizens in the provision of urban transport equipment. In this urban planning is used a number of methods and theories of engineering, with axioms of physics, and that treats people as socioeconomic aggregates, subjecting human behavior under models that explain the movements and preferences through variables in mathematical equations. However, these studies of origin-destination using the empiricism of the natural sciences, cannot, as a scientific method to answer the questions that we face in the urban environment. Hans-Hermann Hoppe (1995) makes it clear that it is impossible to consider that the empiricism of the methods can be applied in the social sciences. In this sense this article aims to present the Human Action, Mises (1949), as a guide to understand what in fact is responsible for the movement of people within the metropolis. Therefore, it seeks to connect Praxeology with the Theory of Space Syntax. For the Theory of Space Syntax, and understand urban spaces as product of human interactions and are treated by the individual logic of their interests, and human dynamics within urban areas that may differ from what was originally planned. Think the cities from the individual can be the solution to urban mobility problems for everyone.

Key words: Space Syntax; Praxeology; Urban Mobility; Infrastructure

Introduction

In the nineteenth century, the medieval towns set new records of population growth, propelled by the Industrial Revolution, changing the medieval town in the industrial metropolis that grows beyond its walls and bastions, such as the Vienna case in 1844

Figure 1: Vienna 1844
Source: Medeiros (2013,p.59)

In so far as the available technologies made possible greater distances to be occupied and the access time to the center of the city remains constant, the questions of how to offer the infrastructure that supports the volume of new inhabitants, the users of the transports arise, among other questions like Sanitation and pollution. This contributed to the emergence of the first urban planners at the end of the 19th century, among these forerunners of Ildefons Cerdà (Spain), Ebenezer Howard (United Kingdom), Georges-Eugène Haussmann (France), and Patrick Geddes (Scotland) with one with his vision of what and how to plan.

In addition, the beginning of the 20th century, a great concern will be placed on the physical design of the new cities, indicating how they should be, such as the Radiant City of Le Corbusier and the Industrial City of Tony Garnier, Further strengthening the static aesthetics of the city to the detriment of people

The commonalities of the various conceptions that guide modern city planning are the injunction of specific areas for each city activity: residential neighborhoods, industrial districts, well-defined green areas, and low population density, increasing the need for greater displacements within the city. To solve this problem, speed assumes its protagonist role in the history of cities: wider streets, with more lanes, and great viaducts. Gehl (2015) pointed that, this desire to build the ideal city eventually alienated people from the city and destroyed the city's economy.

1. **Criticism Of City Planning**

Jane Jacobs (1916-2006) stood out as a great criticism of the model of urban planning that materialized in the American cities, from the second decade of the twentieth century, cities that, like most modern cities, had great influence of the conceptions of Howard and Geddes.

Planners, architects of city design, and those they have led along with their beliefs are not consciously disdainful of the importance of knowing how things work. On the contrary, they have gone to great pains to learn what the saints and sages of modern orthodox planning have said about how cities ought to work and what ought to be good for people and businesses in them. They take this with such devotion that when contradictory reality intrudes, threatening to shatter their dearly won learning they must shrug reality aside.

Jacobs' notes do not suggest a criticism of city thinking, but rather the perspective of deciding how cities are and should be. The more centralized the decision of the city as a whole, the vicissitudes of

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2 Saboya (2007)
3 Jacobs (1961)
people's daily lives are neglected, and the individual behavior of how people act is not considered - quite the contrary, people are told how they should act to fit the new planning.

Strengthening this view of seeing the city as part of a composition of people, Vanderbilt (2008) points out that traffic flow, although mathematically may seem like an independent entity, is made up of people who have their own reasons for going where they are going. Traffic solutions are taken in favor of the flow itself to the detriment of people who are removed from the city and need to understand, in a taxing way, how the flow works, and fit the new standard.

For Gehl (2015), regardless of the economic development conditions of cities, and have different problems with urban mobility, the pattern of neglect with the human dimension has appeared in all city planning in recent decades: The dramatic increase in Automobiles and the urbanistic ideology of modernism, which separates the use of the city and highlights individual and autonomous buildings, would put an end to urban space and city life, resulting in lifeless cities emptied of people.

Jacobs (1961) points out four critical points for the resumption of people's participation in the urban fabric and are conditions "essential for there to be 'exuberant' diversity in the streets in urban public spaces, which favors its use, thus generating flows and security" (BARROS, 2014, p.18):

- The district must serve more than one primary function;
- Most blocks must be short;
- The district must mingle buildings that vary in age and condition;
- There must be a sufficiently dense concentration of people;

These points, signaled by Jacobs (1961), do not function as stages, nor are they independent: they represent a combination of interdependent actions that have the urban morphology as the central point. The existence of short blocks, for example, as a morphological factor, increase the potentiality of the movement and thus cause great social effects in improving the life of the city. The size of the blocks directly interferes with the possibility of paths, because "smaller blocks make the mesh more articulated, which provides more paths for the displacements, be they of pedestrians or vehicles".

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4 Barros (2014, p.20)
As an example, the comparison between paths within a long block idea, figure 3 and another between short blocks, figure 4.
Figure 3 shows the possibilities of a person leaving a dwelling of SQN 215, Block J (point A) and moving to the nearest shop, a convenience store in a gas station (point B) - the linear distance between point A and point B is 153 meters, but the route using the street is 500 meters. In addition to having a single route option, it has a labyrinth-shaped path, making it difficult for people to perceive space. Another point to be observed is that the option to enter and leave the super-block is unique for all inhabitants of the blocks within this block, which by the way is a block with only residential use, with only one type of land use. The planning guided by the ‘super-blocks’, totally ignored the perspective of the people, giving preference to the large scales and big distances, a phenomenon that Gehl (2015) created the nickname of 'Brasilia’s Syndrome', a style that has spread the world since the foundation of the federal capital, in 1956.

In contrast, figure 4 is the illustration of a region in the center of Rome (Italy), with Piazza Navona as point A and the Pantheon as point B. These two points were chosen as a representation of short blocks and the path between the point A and B also be also 500 meters, as in the example of Brasilia. However, there is a real range of different route possibilities. Besides drastically reducing the pressure for infrastructure in the only possible way, in the various routes are also diverse uses: hotels, pizzerias, churches, museums, residences. This diversity of uses caused by the accessibility and options that the integration between the short blocks makes possible, is what makes a city alive, economically active and livable.

Another criterion of analysis is the urban density, which in larger blocks, of the cities planned in large scales, is low, which reduces the economic activity of the cities. It is good to understand that the big flow of cars that runs through the city from the suburb to the center is quite different from a flow caused by the high activity within the city.

Most consumer enterprises are just as dependent as parks on people going to and from throughout the day, but with this difference: if parks lie idle, is bad for them and their neighborhoods but they do not disappear as a consequence. If consumer enterprise lie idle for much of the day they may disappear.

Higher densities in places with more uses and routes optimize urban life and further enhance the sustainability of the city as a whole: for companies and their inhabitants – to be sustainable is to keep the city alive.

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5 Jacobs (1961, p.153)
2. **Mobility And Economics: Epistemological Convergences**

The foundations of the critics of urbanist authors reverberate in other areas that epistemologically commune with important points to provide the solution that cities need, especially in the city's economy. Even though economic science has several currents, as well as urbanism, which are concerned with the solutions constructed in macro plans, there are those that formulate their axioms considering the existence of individuals as individuals who act and that their behavior is important for economic decisions.

The Marginalist Revolution, around 1870, which inaugurated the modern economy had in one of its protagonists Carl Menger (1840-1921) - who coined the subjective theory of value by printing to the economic analysis a teleological, somewhat humanistic value - defined the Economy as the study of the purposeful choices of human beings and their ability to relate events and facts to their final effect⁶. Rothbard pointed that evaluation from the standpoint of the individual is the cornerstone of economic theory, because “fundamentally, economics does not deal with things or material objects. Economics analyzes the logical attributes and consequences of the existence of individual valuations”⁷. This economic point of view is that it converges with the urbanist view that considers mobility as a result of human actions.

It is necessary to understand that people living in cities act and think as individuals when it comes to defining where to go, how to go and what to do during this journey. Simply because they think - they are human beings and not computers that use algorithms to define how to plan their day.

> The answer is by understanding my motives and interests, my convictions and aspirations, my normative orientations, and my Concrete perceptions resulting in this action.⁸

In fact, human action is the foundation that guides Praxeology as a scientific method, and L.V. Mises was assertive in identifying human action as an axiom capable of making economic science a part of Praxeology, since it depends on a logic of action. Praxeology becomes suitable for its application in the study of urban mobility, since it is a science that studies the individual actions of the men that according to the own L.V. Mises points out that “in the further course of its inquiries that cognition of human cooperation is attained and social action is treated as a special case of the

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7. Rothbard (1956, p. 256)  
8. Hoppe (2012, p.34)
more universal category of human action as such." So it is correct to point out Praxeology as an adequate science to study the behavior of society, for it results from the cooperation of the action of individuals.

All the failures of urban planning conceived and implemented in the last fifty years have their origin in two factors: not to understand that the urban economy is a product of the urban mobility, not the opposite; And the second is that everyone disregarded human action and its dynamics, which moves the city as the generator of this mobility, whether it is the city of developed economy or developing countries.

No doubt the better example of epistemological convergence between authors dealing with economics and urban mobility is in the case between F.A. Hayek (1899-1992) and Jane Jacobs. These authors share the teleological search behind the central planning problem.

Yet all those who are fascinated by the beautiful plans which result from such an approach because they are ‘so orderly, so visible, so easy to understand’, are the victims of the synoptic delusion and forget that these plans owe their seeming clarity to the planner’s disregard of all the facts he does not know.

The abandonment of the city life tradition that Gehl (2015) points to is intrinsically linked to the action of the economic agents who construct the dynamics of cities and who were suddenly rearranged but are capable of creating a different reaction from that expected by the planners. Explosive growth occurs just like a dam that breaks up and the volume of distinct reactions between economic agents cause these problems, pointed out in mass transit traffic and overcrowding.

Many treat these criticisms of planning as an ode to the chaotic, in the sense of disorder and uncontrolled, with babelic purposes. However, the thinking of Jacobs and the praxeologists economists point out that there must be conditions for people within a social organization – cities, neighborhoods and districts – to have choices, because “this very fluidity of use and choice among city people is precisely the foundation underlying most city cultural activities and special enterprises of all kinds”.

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9 Mises (1995, p.54)
11 Hayek (1973, p.74)
12 Jacobs (1961, p. 115)
3. **Spacial Syntax**

The spatial syntax, or urban syntax, refers simultaneously to a theory, a methodology and a tool that proposes to investigate the relationship between the socioeconomic phenomenon of cities and their spatial configuration\(^\text{13}\). The epistemological framework of this methodology was the publication of The Social Logic of Space in 1984 by Professors Hillier and Hanson of University College London (UCL).

For spatial syntax, there is a deep relation between cause and effect of the use of space as the product of human interactions in the human dynamics that live in these spaces, which may be different from the dynamics established by city planners\(^\text{14}\). This theory allows us to work with the perspective of human relations and its vision of the city as the cause of flows, rather than the opposite, as proposed by traditional traffic engineering, which seeks to allocate people to the optimal choice of source-destination. Contrary to traditional traffic engineering proposals, the spatial syntax perspective relies on the role of the configuration as the generator of the flow, not as a consequence of it. The configuration shapes the flow, and thus, the flow is the consequence of the configuration.

Configuration may influence the location of attractors, but the location of attractors cannot influence configuration. Likewise, configuration may influence movement but movement cannot influence configuration\(^\text{15}\).

The Spatial Syntax analysis technique allows the identification of flow potentiality within a specific urban space\(^\text{16}\). Do Carmo et al. (2013) points out that the basic elements of this technique are the convex space and the axial line, which allow the spatial syntax methodology to understand the urban space. The lines present the two key properties of being both very simple and global. All we need to know is how much we can see from a point\(^\text{17}\). The analysis of this combination corroborates the construction of Axial Maps that seek to be the linear representation of the network of paths, illustrating the potential of generation of movement in each pathway. The 'xial map of an urban grid consists of the longest and fewest straight lines that can be drawn through the spaces of the grid so that all the grid is covered\(^\text{18}\).

This linear representation of the axial map allows the construction of a matrix of connections that undergoes the Synthetic Analysis of Space it is possible to "measure, quantify and hierarchize differentiated levels of connections between each path and the complex where it is inserted"\(^\text{19}\). This

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13 Rodríguez Dias and Sakr (2014)
14 Barros (2014)
15 Hillier et al. (1993, p.31)
16 Barros et al. (2008)
18 Hillier et al. (1993, p.34)
19 Medeiros (2013, p.152)
hierarchy occurs by the identification of the axes with great potential of flow, comparing the axes with the lowest potential of flow.

![Axial Map](image)

*Figure 5: Axial Map
Source: Medeiros (2013)*

The possibility of the flow of movement within the urban mesh, suggested by the influence of the integration of lines that relate to the whole system, demonstrates how permeable that space is, and in contrast, the existence of barriers (buildings, blocks, rugged terrain) reduce the accessibility and possibility of flow in this space. Influencing the choices of the displacements "give this system a kind of probabilistic field in which it is possible to point out the most probable potential routes to be traveled".

Integration will play a key role in the choice of specific road axes within the urban network, since more integrated axes are those that are more permeable and accessible in urban space, where others are easily reached. When the entire depth map of each axis is observed systemically to reach all the axes of the system, the average depth of this system is found; The more "shallow" a system is, the lower the mean depth, the higher the mean depth we can identify a labyrinthine system with low integration. The most integrated lines we can represent with warm colors; the least integrated, cold colors.

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20 Medeiros, 2013
21 Pereira et al, 2011, p.10
Figure 6: Connectivity & Integration
Source: Medeiros (2013)

Analyzes of these axial maps will play an important role in understanding the behavior of people's movements making it possible to identify the impacts that interventions in the urban fabric can cause in order to increase the integration between the axes, reducing the depth caused by the fragmentation of the mesh. For Medeiros (2013), fragmentation of the urban grid, discontinuity and interstitial voids in the road network lead to less system intelligibility. More intelligible systems have well-connected and more integrated lines. Bandeira (2005) points out that intelligibility helps to identify the importance of specific lines within a road system, since it reveals the difficulty or ease that individuals have in orienting themselves and finding themselves in the system.

4. Final Considerations

Authors like Jane Jacobs and F.A. Hayek present a diagnosis of the social conditions caused by the excesses promoted by central planning. As a tool to measure such an impact the result of the application of Spatial Syntax with the use of axial maps allows to understand the logic of the movement within the cities, from the perspective of the individual who experiences the urban. This vision of the city, which differs from the current forecast strategies for destination source flows, may present more consistent results, since it allows to see how the probable behavior of people's movement in the urban network occurs, and consequently, it would be possible to identify as new interventions Urban models alter people's conception of the new design and thus predict how these modifications would influence the likely new behavior of this movement. Bringing together all the
ideas presented, the Jane Jacobs anti-planner idea, Mises praxeology as a method, and Space Syntax as a tool, is possible to create an epistemological articulation in favor of urban mobility, starting to create cities for people, considering the human action.

References


