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# PLANNING, URBAN SPRAWL AND SPATIAL THINKING

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## Abstract

The main goal is a reflection on the urban model (urban sprawl). We analyze the most desirable and feasible development model. From the perspective of some commentators, planning is merely a set of relatively narrow regulatory functions concerning the use and development of land. For others however, planning is a much broader creative activity, starting by developing and delivering visions for places, often captured in the term 'spatial planning'. The methodology of spatial planning goes beyond traditional land use planning and seeks to integrate policies for the development and use of land into other policies and programmes which influence the nature of places and how they function. Therefore the result of spatial thinking is the knowledge, skills, and habits of mind to use spatial concepts, maps and graphs, and processes of reasoning in order to organize and solve problems.

***Keywords:*** *Expansion, densification, urban model, urban development, sustainability.*

## 1. INTRODUCTION

Urban sprawl began in the 50s in the United States during the car boom. Its ideologist was the architect and urban planner Ludwig Hilberseimer, who, like Le Corbusier, proposed separate housing uses (garden city) and offices. A great defender of this model was Frank Lloyd Wright. At that time the car was a symbol of freedom, courtesy of the American dream, and the oil crisis and the harmful effects of $CO_2$ emissions in the atmosphere were unknown.

In Europe, cities traditionally have complex compact structures, especially due to the existence of a dense historical core formed before the advent of modern transportation systems. Compared to US cities, European urban systems remain relatively compact in many cases. However, European cities have grown rapidly and this has led to the spread of urbanization since 1970. It is a fact that urban sprawl currently affects all European cities (Arellano and Roca, 2010).

Increased spatial mobility in the urban area has become a hallmark of contemporary society.There have been major territorial changes and new residential settlement patterns that have led to urban sprawl (Mejías Vera, 2013).

Rural and urban areas are losing autonomy and territories that reflect a new social reality are being created (Alberdi Collantes, 2013). New forms of semi-urban life are created in the form of residential areas sometimes with golf courses, shopping centers and other amenities (Herce Vallejo, 2015).

Currently, there are two competing models of cities, the compact city and the dispersed city. Examples of the former are Madrid, Barcelona, Paris... cities with a high density and different uses (residential, offices, shops...) (Roca Cladera, Arellano Ramos, and Moix Bergadà, 2011). At the other extreme, in the sprawling city, we have the American city model

with huge residential neighbourhoods of detached houses (Sung, Yi, and Li, 2013). Between the two extremes there are many nuances, as might be the case of Stockholm and its historical city center with multiple uses, connected by railways or tramways to multiple residential neighbourhoods of lower density.

There is consensus on the disadvantages generated by uncontrolled urban sprawl (ADEME, 2001). It can be seen that the lack of planning for growth produces disastrous effects on the city: lack and / or disruption of public transport in different areas of cities, insufficient and inefficient public services, the invasion of land and natural areas; loss of identity and social integration; discouraging urban landscapes; etc (Lahoz Rodríguez, 2010). Thus, in the face of so many examples of urban failure due to uncontrolled horizontal expansion, the premise that expansion ought to be planned is accepted (Lambert, Catchen, and Vogelgesang, 2015).

The assessment of interdependencies between different scales and spaces of a particular area must be one of the basic foundations of any coherent proposal for the planning of a municipality. During recent decades the compact city model has gradually been replaced.

We reflect on two urban models: urban sprawl and the compact city, on the model of urban development and visions of the city we want. We analyse different options to try and find the most desirable and feasible development model for cities.

These two models have multiple effects on the lifestyle of the inhabitants of a city, its economy and the environment. The biggest impact is on the territory itself. A compact city occupies much less than a sprawling one to accommodate the same type of people, both because of the city itself and the infrastructure they need (Burge, 2013). Mobility is an indispensable part of the development of urbanised areas. Due to population density in a compact city, it is economically viable to have a dense network of public transport.

Besides, individual transport, with high fuel consumption (and $CO_2$ emissions), is made more complicated by lack of parking space. In addition, compact city uses are mixed, so that commuting between home, work and leisure may be shorter (Lavadinho, 2014).

In the sprawled city, a dense transport network is not profitable, so an individual car is essential, with the known environmental impacts (Litman, 2003).

The future calls for Smart Cities –cities where information technologies help reduce the impact on the environment, being more economically viable, and improving the quality of life of their inhabitants (Sultana and Weber, 2014).

### 1.1 State of the Art

The changes that have occurred in the industrial city and agriculture as a traditional way of life will cause rural land to be used for different purposes (Daghini, 1999; Camarero, 1993).

In Europe in the 50s, there were already examples of this phenomenon. For example, in Germany when large car factories began to function, thus reducing distances between the countryside and cities. In the 60s, there was progressive abandonment from the centers of large cities to the outskirts of cities called periurban areas (Banzo, 2005).

At the end of the twentieth century the urban labyrinth of cities became saturated and thus a revaluation of the peripheral areas occurred, creating both inter-rural and inter-urban mobility. Urban planning of the outskirts of our cities creates a series of bases and strategies for forming the territorial model, in an effort to identify the scenarios in which it operates and territorial and urban planning of municipalities tends to achieve harmonious integrated development (Simón, Zazo, and Morán, 2012).

The main objective of planning is to order the territory (Benabent Fernández de Córdoba, 2016) and this implies, of course, its assessment both as a resource for planning needs and also as a condition of the planning of the city.

Metropolitan processes, defined as those in which close functional and strategic links over a territory that go beyond the narrow municipal limits, require planned implemented and coordinated action between the towns involved (Yamu and Frankhauser, 2015).

## 2. SPATIAL THINKING AND METODOLOGY

The main goal is a reflection on the urban model (urban sprawl). We analyze the most desirable and feasible development model.

Since the late 1970s, Geographic Information Systems (GIS) have been used by planners, engineers, geologists and others for spatial analysis. Researchers are using data to generate new insights into how the nature of places affects people and communities. Places need to be at the forefront of our responses to these challenges, and so at the heart of policy and decision-making in the twenty-first century (EC, 2010; EC, 2011). Politicians and decision-makers can learn much from the theory and practice of 'spatial planning'

From the perspective of some commentators, planning is merely a set of regulatory functions concerning the use and development of land. For others however, planning is a much broader creative activity, starting with the development of visions for places, often captured in the term 'spatial planning'. Spatial planning goes beyond traditional land use planning and seeks to integrate policies for the development and use of land into other policies and programmes which influence the nature of places and how they function (Saint-Julien, 2001).

Spatial thinking is the knowledge, skills, and habits of mind to use spatial concepts, maps and graphs, and processes of reasoning to organize and solve problems (Gersmehl, 2005). Spatial thinking skills (see Gersmehl and Gersmehl, 2006) are important for investigating a range of environmental issues including land use management in urban environments.

The most important question that a spatial thinker asks is not where? But why? To nurture spatial thinking, we must couple where with why. Most urban areas face the growing problems of sprawl that may result in a loss of natural vegetation, agricultural lands, and open space due to commercial, industrial, and residential development that often occurs because of population growth and expansion. Such growth is often accompanied by a general decline in the extent and connectivity of wildlife and wetland habitat. Land cover and land use changes can be substantial but are difficult to grasp when they occur incrementally (Lagrandeur-Bouressy, 1999). The availability of satellite data and aerial photographs from different periods of time dramatically illustrates the rates at which these land use changes are occurring in urban areas. Analyzing such spatial data over time provides one with a visual depiction of geographic growth patterns, and conveys how changes to the landscape occur.

Many welcome this new attention to spatial thinking and are hopeful for the future. Without spatial thinking, the complex issues facing our world cannot be effectively and completely dealt with. Without spatial thinking, scale may be critical to a problem but ignored.

## 3. SPATIAL THINKING AND DIFFERENT APPROACHES FOR PLANNING THE URBAN MODEL

We need to assess whether there is any structure or series of spatial structures that maximises fairness and efficiency within an urban system; whether one kind of urban density is more desirable than another, considering the cost/benefit ratio to society (Pelletier and Delfante, 2000).

The most appropriate form of urban growth will be sought for achieving sustainable development of urban societies. It is therefore necessary to rethink the notion of space, and whether it is limited or scarce.

Places of residence and work, as well as other daily activities, are increasingly distant from each other. Therefore, increasingly bigger spaces are experiencing a renewed demographic dynamism as a result of the resettlement of urban families or of newly created households moving to new residential areas. This process has a clear urban and territorial incidence due to the transformation of host areas as a result of urbanization, building and construction of urban infrastructure (Hernandez-Rejon, 2014).

These new spaces have acquired an increasingly greater role in the process of settlement of new population strata, which have either sought uncongested residential environments or have been forced to do so due to the higher price of housing in the city centre (Guglielmo, 1996). In this scenario, the new concept of urban sprawl appeared on the international scene with force; a term used with the original English meaning to encompass all these territorial realities involving the dispersion and diffusion of urban uses for territory (García-Lopez and Muñiz, 2013).

The architects of the Modern Movement foresaw a vertical model and to some degree, a dense city—vertical buildings, embedded in a large public space and as green as possible. A vertical city integrated in nature (López de Lucio, 2000), for example Toronto.

However, European experts now see the *vulgarization* of the ideas of the Modern Movement, which favored the dramatic "housing megacomplex" and the separation of urban functions (zoning) as a major cause of degradation to the model of European city and peri-urban expansion.

In Europe, the periurban agrarian spaces are subjected to the greatest urban pressure: between 1990 and 2000, 77% of the new artificial uses grew in agrarian areas. When analyzing the evolving objectives of spatial planning in the European Union, it is evident that agrarian systems have been given lesser significance. This is neither a consequence of the environmentalist discourse nor the scenario created by the energy crisis, but the consequence of global change and depletion of resources (Hennig et al., 2015; Oueslati et al, 2015). Neither does the Common Agricultural Policy help to preserve periurban agrarian spaces that will play an important role in the future viability of our cities. The establishment of adequate forms of protection, their reconsideration within the planning tools and the enhancement of agricultural activity would reduce urban expectations, slowing down their transformation (Talen, 2013).

Many cities have tried to react to explosive and chaotic metropolitan development generated largely by country–city migration. Each metropolis has even experienced several models over time. Cairo, Egypt, is a good example of the search for various planning solutions to respond to an explosive metropolization (Chaline, 1996): lack of planning, Malthusian logic and rejection of territorial expansion, ordered expansion and densification of alternate poles.

It is necessary to consider the dynamics of peripheral land, speculation both in urban centers and in new areas of urban development, the instruments available to the public sector to influence these decisive trends in the creation of the metropolitan spatial form. For example, the incorporation of privately owned land on the outskirts usually dispersed in low surface land and many owners' hands. This has consequences for urban spatial expansion (Ramirez, 2003).

Suburbanization in the case of Paris, for example, is partly due to the expulsion of the middle class to the suburbs, due to inaccessible rents for housing this population (Comission Européenne, 1999; ADEME, 2001). The great advantage of peripheral metropolitan areas in

every city in the world for both private housing and businesses and industries is not only space, but space at an affordable price.

In recent years and in reaction to both forms of urban expansion that were occurring, and to the degradation of the existing urban fabric, a consensus among European planners about the need for densification, urban recycling and the need to remake the city, was formed. This consensus has gradually spread in global urban media.

In France, the concept was formalized with the law of December 2000, under the name of "renouvellement urbain" (urban regeneration), whose main objective was to "redevelop the city on top of existing urban areas". It consists of guiding urbanism towards the improvement and revitalization of the existing urban areas. The essence of this new urban concept presented in the law is: a new model of development and running of the city, looking to save space and energy, regenerating degraded urban spaces and increasing socio-spatial integration (Journal Officiel, 2000).

This cultural change in urbanism is common throughout Europe. The European Union has been supporting this trend since 1999 in its "European Spatial Development Perspective". The conclusions of analytical work groups emphasized the need to contain uncontrolled suburbanization, that is, a horizontal urban sprawl, and translated the recommendations into the concept of polycentric spatial development (Ascher, 1995, 2001). Territories must be organized into balanced groups rather than a few large metropolitan cities (Hiernaux, 2003).

According to experts, the benefits of a compact city model are: improved public transport services, better provision of public services; reuse of infrastructure and socio-functional mixture; sociability and urban vitality; a favorable business environment, preservation of green areas, saving agricultural land and less complex governance (Wheeler, 2002).

This urban pattern has generated numerous operations both in medium-sized towns and large cities resulting in densification and successful urban renewal i.e. the Guggenheim Museum Bilbao. The Guggenheim Museum Bilbao was conceived as a symbol of the urban renewal process. The building is listed as one of the 20 most beautiful and representative buildings of the twentieth century, stimulating Bilbao to become a major destination for tourism and culture in Spain in only two decades (Fernandez Milan and Creutzig, 2016).

In 1980, Bilbao began a process of urban renewal with important infrastructure such as a public transport system (underground) and the Guggenheim museum as a symbol of access to global culture in brownfields in the city center, so cities in this way attract movement of people and economic activities.

Many cities have followed suit, using striking architectural creativity to densify and reconvert degraded and/or abandoned urban areas, and at the same time position themselves (Powel, 2000). Densification in its vertical expression is a change for innovation in techniques of rehabilitation of old buildings; in terms of harmonious blends between modern architecture and historic architecture; in insertion taking into account the existing urban fabric. The example of the famous tower of the Hongkong Bank by architect Norman Foster (1979-1986) is expressive. The decision to air condition the building with sea water taken from the port, instead of the classic circuits of air conditioning, allowed 25,000$m^2$ to be saved and compensate for the additional costs incurred in the work in 10 years, as well as substantial environmental benefits in the long term (Pearman, 2002).

In Chicago, the transfer of middle and upper class populations to outlying areas surrounding the metropolis occurred from the 1950s. The intention was to create true urban centres with independent and attractive city centres. In the north, Evanston developed as a result of the introduction of the Northwestern University; Lake Forest was a new city with 35,000 inhabitants following the English model. In fact, the spatial model of university campus, outside cities but near them, extensive, green and closed, is a typical example of this form of urban territorial expansion (Lahoz Rodríguez, 2010).

The new distribution of economic functions tends to promote policentrality in the city, through the emergence of new dynamic urban spaces around shopping malls or modern tertiary economic activities. This is a metropolitan trend that occurs on a global scale. It can be a sustainable way to address metropolitan development and planning. It is essential that the expansion is planned: the same precautions as with the compact model are required (Lambert, Catchen and Vogelgesang, 2015).

The recent urban history of Madrid is interesting because it shows both the negative effects of unplanned expansion poles, as well as a possible way to redirect growth while maintaining the model of growth poles. Since the 1950s urban expansion has been very rapid and uncontrolled because it was extended in all directions except to the west where the Retiro Park served as a border to contain the anarchic urbanization. The peripheral nuclei were born spontaneously, poorly linked to the center, lacking amenities/facilities and made of large housing complexes. This urban system has not been organized and has resulted in the lack of accessibility and services for peripheral poles (Pelletier and Delfante, 2000). Currently, the main axes of the metropolitan planning to limit the negative effects of this phenomenon and simultaneously use the potential of this peripheral expansion are: fewer new housing programs in the satellite nuclei, creation of industrial poles of medium size in suburban Madrid, the implementation of infrastructure (water, sanitation) and a network of fast roads and periphery trains (Roca Cladera, Arellano Ramos, and Moix Bergadà, 2011).

The opponents of the expansion emphasize certain advantages of the compact city model and criticize a form of particular expansion: chaotic and uncontrolled expansion, when the metropolis faced a mass migration. The way in which this type of urban growth took place was very negative and unsustainable—self-construction, land invasion, lack of basic services, socio-territorial segregation. Planners are now more and more in favor of metropolitan development through structured periphery poles (Allmendinger and Haughton, 2010).

In 1961, Jean Gottmann described the emergence of a new urban model he called megacities—a number of cities that were casually contiguous and could merge with the passage of time. The Gottman concept could be applied today in Japan in the urban regions of Tokyo, Nagoya, Kyoto and Osaka. However, there is a fundamental difference between the urbanized northeastern United States (Boston, New York, Baltimore, Washington) where the Gotmman phenomenon occurred spontaneously, whereas in Japan it was carefully planned as the focus of national development. One of the instruments used in Japan was the bullet train linking the mentioned cities which reaches an average speed of about 200km/h.

Spatial thinking must evolve from a culture of urban sprawl towards a culture of management of the buildings. We must move from the negative view of devalued neighbourhoods to a positive view of the opportunities generated by existing neighbourhoods despite their poor condition. Also we have to clearly associate the concepts of socio-economic revitalization with those of urban policy. And finally, it is vital to integrate both private and social sectors into the implementation of the policies designed. It is also important to convince developers of the importance and feasibility of urban development policies.

### 3.1 Smart growth on the rise

Smart growth promotes a shift in conventional development patterns, and reaches out across disciplines. It is surprising the extent to which a wide variety of professionals, elected officials and individuals recognize that the ability to address development challenges and serious contemporary problems is dependent on a new vision of metropolitan and regional cooperation and an interdisciplinary process.

In response to the increasing popularity of smart growth, several organizations have emerged across the nation. In the mid-1990s The American Planning Association joined 60 public interest groups across the United States to form Smart Growth America, a nationwide coalition that coordinates efforts to promote smart growth. After its debut in October 2000, it rapidly became the focal point for advocacy in a series of issues confronting communities nationwide. Today, it advocates better growth policies and practices at local, state, and federal levels to promote farmland and open space protection, neighborhood revitalization, affordable housing, and the creation of liveable communities. The University of Maryland, in cooperation with Former Governor Paris Glendening and the State of Maryland, created the National Center for Smart Growth. It endeavors to lead the nation in research-based knowledge and education by tackling a wide range of growth, preservation, and development problems (Gavinha, and Sui, 2003).

The ills caused by urban sprawl, both in residential suburbs and in the rehabilitation of important degraded downtown areas, are alleviated by using the "smart growth" formula which sets out the principles for sustainable development and entails a critical review of traditional urban design.

In 1994, as in the Clinton administration, the Department of Housing and Urban Development approved national funding for a seven-year project. Among the main results of the project are two major publications, the guide The Growing Smart Legislative Guidebook (1996) and a collection of working papers Modernizing State Planning Statutes. The Guidebook was intended to be a manual, and practice became the main reference for future initiatives of states. Not only did it include all the recommendations of the federal Advisory Committee, but also provided alternative models of by laws for implementation at state level (Johnson et al., 2002).

Based on the experience of communities around the world that have used smart growth approaches to create and maintain great neighbourhoods (for example, in the state of Massachusetts), the Smart Growth Network developed a set of 10 basic principles to guide smart growth strategies:

- Mixed land uses.
- Taking advantage of compact building design.
- Creating a range of housing opportunities and choices.
- Creating walkable neighbourhoods.
- Fostering distinctive, attractive communities with a strong sense of place.
- Preserving open space, farmland, natural beauty, and critical environmental areas.
- Strengthening and directing development towards existing communities.
- Providing a variety of transportation choices.
- Making development decisions predictable, fair, and cost effective.
- Encouraging community and stakeholder collaboration in development decisions.

Many of the ideas on which smart growth is based are not new. In the past, they were already included in concepts such as "regional growth coordination", "sustainable development", historic preservation and conservation" or even "new urban model". The words "smart growth" suggest less dogmatic action and quickly grew in popularity in an era when the public interest in a problem also depended on a memorable expression (Krieger, 2001).

## 4. CONCLUSIONS

The development of a city is more than just property management. We cannot manage a city by thinking in terms of a product or the market share. Due to the revolution of communications, a city is nowadays a space for relationships, very often virtual. Urbanism is more than management on paper and should seek an increase in the sense of belonging in citizens and their involvement in the development process of a city.

Importing urban models such as townhouses or terraced houses entails dispersion and fragmentation together with the difficulty to manage the local infrastructure and services let alone assessing its difficulty to coordinate with the principle of social cohesion. Therefore, these models should not be encouraged.

In this regard, it is important to note that new developments should be maintained by all, and conservation agencies (Private), are not a valid or culturally acceptable solution for our cities, therefore when starting a new development, we must not stop at the mere equal distribution of benefits and burdens, we must also contemplate the future management and maintenance of the new development, which will be paid for by all citizens, many of whom probably do not enjoy the same standards of urban quality. It will also be important to consider environmental management criteria on which the urban technique currently counts, for example, minimizing energy expenditure or encouraging water saving.

Another problem is the need for improved relations in the intermunicipality field, or beyond. Neither the territory nor the problems that affect it know administrative boundaries. However, we find that on the other side of the line separating our municipality from our environment, there is a void……nothing. Administratively, our area of responsibility is limited exclusively to the boundaries of our municipality, but from the perspective of planning, our problems and needs cross them significantly.

Most problems affecting sustainability are caused by society as a whole and we must take measures to solve them. This unveils planning as an effective tool since it may be able to establish indicators to diagnose a situation and enable us to monitor it. They must arbitrate financial measures that allow us to act on the problems detected.

It is important to note that many of the mentioned problematic or unsustainable aspects could be overcome through environmental education that leads to concrete actions, thus making planning activities more acceptable to the population.

Smart growth is the development that supports economic growth, strong communities and environmental health. “Smart growth” covers a range of development and conservation strategies that help protect our health and natural environment and make our communities more attractive, economically stronger, and more socially diverse.

Development decisions affect many of the things that touch people’s everyday lives — their homes, their health, the schools their children attend, the taxes they pay, their daily commute, the natural environment around them, economic growth in their community, and opportunities to achieve their dreams and goals. What, where, and how communities build will affect their residents’ lives for generations to come.

Communities of all sizes across the country are using creative strategies to develop in ways that preserve natural lands and critical environmental areas, protect water and air quality, and reuse already-developed land. They conserve resources by reinvesting in existing infrastructure and rehabilitating historic buildings.

They design neighbourhoods that have homes near shops, offices, schools, houses of worship, parks, and other amenities, giving residents and visitors the option of walking, cycling, taking public transport, or driving as they go about their business.

They enhance neighbourhoods and involve residents in development decisions, creating vibrant places to live, work and play. The high quality of life makes these communities economically competitive, creates business opportunities, and strengthens the local tax base.

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