The adaptability of the urban fabric according to the grid, use and service: Study of the “supermanzana” type – cases in Barcelona and Lisbon

The cities of the twenty-first century struggle with the problem of adapting their urban fabrics to the desirable parameters of urban quality with regard to their multiple services. The investigation of the flexibility or modification of the uses of urban fabrics, according to the functional characteristics of their layouts, allows us to understand how cities adapt to the new needs. On the other hand, the presence of several levels of traffic routes imposes a dynamics hierarchy to the city that is reflected in the way the citizens enjoy the public space.

The typical Mediterranean city has been characterised by both streets and squares as meeting places and by the blocks that, according to Salvador Rueda, represent the basic unit of urban systems (Rueda, Cáceres, & Albert Cuchí, 2012). The uses or services present, especially on the ground floors of the buildings, characterise the urban dynamics and organizations in which the interstitial space between blocks is the space that directly interacts with the urban activities.

In this sense, and considering that cities are basically consolidated, it is important to understand which intervention procedures best minimize the impact of transportation (public and private) in the public space. One of the greatest qualities offered by the urban space was lost with the lawless imposition of motor vehicles in the urban space, as it caused the decrease of other possible uses and activities. The importance of the subject of adaptability can be analysed in cities such as Barcelona, where Cerdà’s layout (nineteenth century) has been the base for different organizations designed for the city in terms of mobility and adjustment to the different uses. By keeping the same blocks fabric, the Catalan capital has been reorganizing and regenerating the public space in order to streamline the road system and enhance the public space for various uses. In this sense, Barcelona is a model case study, since it has been finding forms of intervention based on analytical tools and evaluation procedures adapted to each phase of the city.

On the other hand, we are currently faced with consolidated cities in which the alteration of systems that cater to everyday life functions (such as road systems, pedestrian systems, parks and gardens) are already established and organized. Operation can be more effective or less effective depending on the urban fabric. Due to the complex organization of a city, altering the systems requires minimal and functional intervention solutions. This is both understandable and defensible, as the cities change at a slow pace, according to the needs and uses of the populations. Consequently, are considered more viable the interventions that are reversible and less aggressive to the cities’ dynamics, requiring in most cases lower investments. In this sense, this dissertation seeks to examine how the urban fabrics affect the adaptability of the public spaces of cities and to investigate a concrete model of reorganization of mobility and public space adopted in Barcelona: the new “supermanzana (superblock)” model. In fact, the term is related to the organizational conceptions of the urban history of the city centred on the grouping of blocks.
("manzanas") but its current meaning represents today a method meant to offer higher quality public space and mobility.

Therefore, we will begin this dissertation with the case study of Barcelona, highlighting the terms and concepts associated with the morphology of the urban fabrics and the relationship with the surrounding setting, specifying the significant milestones of the urban history up to the current conception of the "supermanzana" model.

**The orthogonal fabric and its relationship with the public space**

Urban flexibility is present in the set of elements that make up the city, since it is they who award value, significance and quality of urban life. Through this study, we intend to draw attention to the set of quality indicators that enabled minimal interventions in order to enhance the areas that offer greater adaptability to the new uses and functions.

The reticular fabric, such as the *Eixample* district in Barcelona, grants a simple structure to the urban space and allows the rationalization of motor vehicles and pedestrian mobility. The grid model, whether orthogonal or more irregular, allows motor traffic restrictions in some streets, with the ability to better regulate the traffic of vehicles in relation to pedestrian movements.

The fabrics in which elements are 80 to 100 m apart (approximately) allow the public space to offer optimal networks of spaces designed for the citizens, who can move on foot, while maintaining good road traffic. Areas where mobility is soft (easy travel on foot or by bike), with a space between elements of 50 to 70m, offer an optimal network of public spaces. On the other hand, these dimensions may not be the most appropriate with regard to the overall urban shape of the cities, as they may prevent the fixation of a plurality of services in this fabric, due to the small size of the buildings and resulting spatial adequacy for certain uses that require large areas. (Yeang, 2000)

![Image 1 - Types of occupation of one same parceling. (Yeang, 2000)](image)

The first scheme presented in Image 1 depicts an organization similar to that of the *Eixample*, where a single block occupies the entire perimeter of the parcelling. According to Yeang (Yeang, 2000), the first scheme enabled a wide variety of uses but offered weak permeability, leading Cerdà to propose, in the late nineteenth century, inner courtyards for reasons of brightness and ventilation. The second scheme, which housing dimensions are 65x65m, allowed good permeability because it had inner streets (pedestrian or mixed) and an average capacity for different (or mixed) uses. The final urban fabric option awarded the city a high permeability but did not allow such a high diversity of uses because of the diminutive occupation area (35m), unless there was vertical construction.
In fact, the organization in square plants is usually the most flexible way for a city to have commerce, housing and services, as they allow various possibilities of internal spatial distribution. Well configured blocks facilitate a multitude of uses and have the capacity to accommodate parking and leisure areas. (Yeang, 2000)

From the spatial point of view, the new model for mobility and public space proposed in "supermanzanas" offers the best of both possibilities. If, on one hand, the existing Cerdà fabric is constituted by a nearly square blocks (which are actually octagons), on the other hand the idea of agglomerating them into sets of nine blocks allows for a variety of forms, an adaptability to the local scale and a rationalization of car traffic. In addition to providing a "human scale", that is, the possibility of moving on foot, it allows a high density of population flow, which leads to the use and exploitation of the public space as a privileged area for activities. On the other hand, space rationalization and adequacy are achieved on two scales: the city and the neighbourhood or community.

**Notion of ensanche as a form of urban growth**

The *Eixample* area in Barcelona, identified with Cerdá’s plan of 1859, represented the expansion of a city which urban fabric was restricted to the historic hub and dispersed settlements (such as the Gràcia, Poblenou, Sarrià and Sants communities, among others). In fact, *Eixample* is the Catalan word for *Ensanche* (Spanish word for "widening") and, in this sense, many cities carried out expansion plans of this type in the late nineteenth century. It is possible to characterize various *ensanches* that, starting from the layout to the typological definition of a construction unit (the block or "manzana"), systematize a generalization for an entire area of the city, as a common urban planning mechanism. The area to expand and the type of construction are the starting points for the plan, from which would result a morphological organisation and also an organisation of the city’s infrastructures, eventually also coming to define the entire formal road layout and the type and location of the city’s services. In fact, the ordinances stipulated by Cerdà allowed this process of territory planning. These ordinances defined for the *Eixample* the minimum and maximum dimensions for construction, allowing for complete independence of the construction activities in themselves (Solà-Morales, 1997).

In fact, the model of *ensanche* is inseparable (but not always in the same way) from the idea of planning and designing the entire urban fabric as if it were one single piece. However, and despite being designed as a single complex element, Cerdà’s *ensanche* had a distinctive feature. According to Solà-Morales i Rubió (Solà-Morales, 1997), the process of production of the new urban fabric for Barcelona can be understood in three distinct and sequential levels: Parcelling (P), Urbanization (U) and Construction (C). According to the author, these three components defined the city’s construction process and the structural typology of *Eixample* is a planning process that followed the P-U-C chronological order. Firstly, Cerdà carried out the reorganization of the agricultural land through the parcelling of land, restructuring the divisions of private property; secondly, he proposed a model of urban occupation (reticulated fabric) and, finally, envisaged the housing infrastructure as a basic unit of the urban fabric proposed ("manzana"). In fact, the layout defined in the plans became the basic element of the planning of the previous urban space and independent from the construction. There is an urban structure that subsists, whether a constructed structure exists or not ("manzanas").

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1 The same can be observed in Lisbon’s *ensanches*: Baixa-Pombalina, Avenidas Novas and Parque das Nações (former Expo ‘98), among others.
"Supermanzana" as a model of public space and mobility

In 1859 a tender was held for the renewal and expansion of the city of Barcelona (Eixample or Plan for the Renewal and Extension of Barcelona) and the project by Ildefons Cerdá gained clear notoriety due to its hygiene and circulation-related characteristics in a structure based on regular layouts created over the pre-existing fabric. The basic unit of this urban structure is the "manzana" (Image 2), characterized by a square block (approx. 113m x 113m) composed of several buildings with a central courtyard. Cerdá also proposes the grouping of several "manzanas" (Image 3) to create public equipments and infrastructures (hospitals, university, train station). In 1934, with the Macià Plan, there is a reinterpretation of the "manzanas" urban fabric in the Eixample, creating a logic of specialization of streets and housing distribution through "supermanzanas" (Image 4) that introduced functional innovations consistent with Cerdà’s Plan and renewed the city, facilitating mobility, accessibility and other services for motor vehicles, already in a process of widespread use at the time.

In the twenty-first century, the Agència d'Ecologia Urbana [Urban Ecology Agency], a consultant of the Ajuntament de Barcelona [Barcelona Municipality] updates the concept of "supermanzana" as a grouping of several blocks, enriching the concept to account for a city with less traffic and more pedestrian public space (Image 5). This new urban cell allows the concentration of motor traffic on main roads, creating more public space for pedestrian and shared use. In fact, the current "supermanzanas" were conceived by the Agència d'Ecologia Urbana, consultant to the Ajuntament de Barcelona, as part of an eco-certification procedure for existing urban fabrics and for areas under planning. Due to the magnitude of the urban...
intervention, the proposal for the implementation of the "supermanzana" model was considered a pilot project in five areas of the city: Supermanzana Piloto de Les Corts: La Maternitat and Sant Ramon neighbourhood; Supermanzana Piloto Plaça de les Glòries: Sagrada Familia and El Fort Pienc del Districte de Eixample neighbourhood and Clot and Parc de Llacuna neighbourhoods in the Distrito de Sant Marti; Supermanzana Piloto Sant Marti: Poblenou neighbourhood; Supermanzana Piloto Eixample: old and new left neighbourhoods of the Eixample and Supermanzana Piloto de Sants Montjuic: Sants and Hostafrancs neighbourhoods.

Although the term "supermanzana" is associated with the city of Barcelona, the "supermanzana" model has been studied and applied to other Spanish cities, such as Figueres and Vitoria. This is possible because the actual goal is the clustering of blocks in which, in this case, several blocks are grouped into sets (which sides should not exceed 300m) whose inner space is shared within a single platform, giving priority to the pedestrian. Outside the "supermanzanas" motor traffic has its own traffic lanes.

For the implementation of the new model there is an assessment system that involves fairly broad indicators (51 in total) that evaluate or diagnose the urban fabric, allowing us to understand its strengths and weaknesses. Based on this accreditation system for specific proposals of territory planning there is an investment in the improvement of the quality of the public space and mobility at several levels. Secondly, we will analyse and develop the evaluative methodology based on indicators relating to the issues of public space and habitability as well as mobility and services.

Application of the "supermanzana" model to the Lisbon case studies

Finally, this study is meant to analyse two case studies in Lisbon: Avenidas Novas and Parque das Nações. It is important to understand how the urban fabrics with specific characteristics can be reorganised into new “supermanzanas” in order to improve mobility and the public space. In the evaluation of the strengths and weaknesses were especially valuable the following indicators: Accessibility of roadways, Public space intended for pedestrians, Street proportion, Proximity to public transportation networks and Occupation of roadways.

The methodology used (application of the procedure advocated by the Agència d’Ecologia Urbana) is suitable and able to adequately represent the characteristics of the urban fabric and of the public space of
an area as well as to analyze the distribution of mobility related to public transportation in the study area selected. In these two examples of ensanche, different from the historical and urban point of view, we find that in the first case study – the Avenidas Novas – there is excessive road occupation and the pedestrian public spaces - and especially the spaces for leisure - are irrelevant in view of the extent of the territory, despite the fact that this is a central part of the city, with local trade and services, and with optimum conditions in terms of public transportation interfaces (three networks). As regards the second case, the Parque das Nações, the residential waterfront area analyzed is lacking in terms of connections between public transportation interfaces, despite being conducive to the enjoyment of the public space.

With the five quality indicators considered most relevant to the analysis in the scope of public space and mobility we can understand the virtues and shortcomings of an urban fabric and its capacity to absorb new uses. This depends both on the base parcelling and on variables, in particular the variables of the integration of the territory in the city, the proximity to public transportation and the quantity of pedestrian public space. Despite the existence of pedestrian public space, this fact alone is not enough, because the movements occur in accordance with the needs of the populations (trade, services, transportation and leisure). Therefore, to implement a model based on “supermanzanas” it is important to study in detail the activities and routines of the population as well as the ability of each urban fabric to adapt to the model’s constraints.

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