

# Parametric Places 22@: Smart Urban Analysis Tools and Place Branding Value

P. Speranza

*Bottom Up Urban Design Lab, University of Oregon, Portland, Oregon, United States*

## Abstract

*Parametric relationships between protected cultural buildings and public open space enhance the sustainability and place branding values of existing manufactured built form in city districts. The research investigates the development of smart urban design tools to understand these relationships in the 22@ information activities district of Barcelona. These tools identify design criteria parameters and use computation to create a unit block prototype that is subsequently informed with real world external data across the blocks of the 22@ study area. The outcome of these urban analysis tools is the ability to use computation to understand multiple urban design criteria for qualitative values. The value is sustainable in the reuse of built form, social in the acknowledgement of culture and economic in the place branding value these tools provide to the ongoing evolvable identity of places.*

## 1 INTRODUCTION

435€ billion: the value of the Eiffel Tower to the French Economy. (Monza & Brianza 2012)

Smart urban design tools identify and optimize relationships between *modernisme* historic built fabric manufacturing from previous generations and public open space to enhance the place brand identity of city districts such as Barcelona's 22@ information activities district. Protection and acknowledgement of *patrimonio* or culturally historic buildings, provides not only place branding value but also a sustainable approach toward the built environment as a non-polluting process, energy conservation and the minimizing the use of natural resources. This new bottom up approach to urban design planning builds on open-ended guidelines of the Digital Cities movement of the 1990's and 2000's particularly tested in 22@ Barcelona. Smart and bottom up design differs from traditional top down planning to allow for a more current attachment to place using intelligent/smart technology for planning to adapt to each generation.

## 2 BACKGROUND

In 2000 the city government of Barcelona conceived of an information activities district, similar to Silicon Valley, located in the post-industrial neighborhood of Poblenou (Barcelo 2001). Its dual purpose was to diversify the city's business activities and to continue urban renewal along the waterfront. Unlike the time constrained *tabula rasa* top-down urban planning for the 1992 Olympic Games that demolished large expanses of the city, the planning of 22@ promoted a plurality of small and medium sized enterprises by protecting historic industrial fabric and newly specified block-by-block guidelines for minimum requirements of 10% open space, 10% protected residential and 10% 7@ social service uses. Rather than adopting traditional axial structure to connect blocks, the *connectivity* of the 22@ blocks is left undefined. Likewise undefined are the relations between the 10% open spaces and the protected *modernisme* built fabric.

The term place brand in the context I will use here explains the identity of a place as originated from over time from use, or what I call bottom up

design. In the case of Barcelona and 22@ the place brand is the Poblenou factory village once known as the Manchester of the Iberian Peninsula and the economic engine of Catalunya (22@ 2011). Modernisme, or the Catalan Art Nouveau movement, and particularly Anton Gaudí's work in Barcelona, provides a clear economic place brand value for the city of Barcelona as exemplified with the Sagrada Família ranking third at 90€ billion according to the Monza & Brianza Chamber of Commerce study of 2012. In the new 22@ information activities zone with greater density including towers up to fifteen stories tall and the removal of most built fabric, the material character of the built fabric provides a unique and value *modernisme* identity that is not optimized for the public experience of the place.

### 3 APPROACH

Parametric Places describes the research objectives used to create urban analysis tools to draw relationships between otherwise unrelated aspects of 22@ planning guidelines. The research is done primarily in the Parametric Places media course with additional data from the life | city | adaptation: Barcelona Urban Design Program, both within the research lab of the Bottom Up Urban Design Lab, at the University of Oregon, Portland and Eugene. The tools developed in this research were subsequently presented to the 22@ district planning office within the Ajuntament de Barcelona.

Although the research is technology innovation driven, the individual project tools are user driven to solve applications problems to enhance the needs of people. The research operates from two ends, an understanding of urban design principles and an investigation of parametric media. The urban design criteria and the parametric variables become one in the same. The objective is to identify the criteria in the real world problem and building a parametric system that is unit, organization and external force, to simulate that condition.

In the case of 22@ Barcelona we began by understanding the real world culture, history, material built fabric, transportation, urban structure, street sections and use of the 22@ district in Barcelona. In parallel we developed parametric urbanism understandings working from singularities through systems based parametric design using Grasshopper software and in some cases optimization algorithms using Galapagos software (Rutten 2007).

We began with existing design criteria of the 22@ district. To capture new real estate values and change from the existing 22a heavy industrial use to contemporary information technology use property

developers needed to provide within each block: 10% public open space, 10% protected housing and 10% public services. Floor area ratios were subsequently increased from 2.0 to 3.0 (22@ 2011). Additionally, and important to our place branding research, selective *patrimonio*, or culturally historic buildings, were protected in the district. A systems based approach was begun with analysis of the underlying Cerdà Eixample plan and patterning exercises explored the analog method to understand unit to whole patterning variations and urban scale. Case studies of parametric urban design work included the following: Stan Allen and James Corner's Freshkills Park; Patrik Schumacher and Zaha Hadid's Kartal-Pendik Masterplan; MVRDV Datatown; Ana Pla Catala's GSD Barcelona Project; Neil Leach's Swarm Urbanism; Vicente Guallart's Cristobal de Moura Street .

Projects identified criteria as parameters to develop new planning tools for the district based on research identifying the purpose, importance and whom it served within the mixed IT worker and residential neighborhood. Projects included Historic / Open Space, with students Ben Prager & Ivan Kostic; Food Market @22, with students Jeffrey Stattler & Yin Yu and Cultural Use of Open Space with students Jared Barak and Casey Hagerman.

The approach used Grasshopper parametric plugin to develop sets of relationships. Data including zoning use, protected built fabric, transportation, open space and street types were extracted from the 22@ district Ajuntament de Barcelona plan provided to us by the 22@ district planning office. Research also relied on data from the 22@ Ten Years (22@ 2011) analytical research done by the Universidad Politècnica de Catalunya, UPC.

### 4 PARAMETRIC PLACES

Projects strived to develop an adaptive unit block first analog and then digitally. Conventional planning relies on two dimensional plans and written guidelines. The research tests the possibility of using parametric models as zoning use tools. The research projects looked to close a research gap of organization while building on the data collection and qualitative solutions of the previous I|c|a:BCN Urban Design programs including: in 2012, University of Oregon's 'Connectivity' and independent program 'Materiality as Identity research'; in 2011 'Cultural Events' and 'Public Food Market Networks'. In these programs zoning uses and other criteria were mapped. Previous research understandings of pueblitos in Barcelona were explored in the paper (Speranza 2013) and place branding value (Speranza 2012) supported this research.

#### 4.1 Historic / Open Space, Kostic Prager

The project Historic / Open Space investigates the relationship between historic *modernisme* presence and open space. The importance of this idea was based on the place branding and sustainable value latent in such a relationship. The relationship of the public open space to *modernisme* place branding would benefit both the business identity and residential *pueblo* identity of the district.

Human spatial experience is the real world objective of the project. The identification and protection of city texture via details and sensory experience can play an important role in how we recognize and remember a unique place (Vitiello and Willcocks 2006). Historic / Open Space seeks to optimize the latent value of the small-scale *pueblo* experience (Speranza 2013) of the 22@ blocks.

The Francisco Franco regime's strict enforcement of no new residential use resulted in limited residential construction between 1935 and 1975, with distinguishable modernism buildings from 1880 to 1935. As an industrially zoned Poblenou area, open spaces were not provided as parks or as interior block patios, an exemplary aspect of typical Barcelona Eixample blocks.

The urban analysis tool Historic / Open Space thusly has the objective of relating public open space with the place branding value of historic built fabric, giving this limited but evenly distributed public space the *modernisme* identity of Barcelona, and in a similar though lesser degree the economic value of the Sagrada Familia example listed earlier. This relationship is important because it increases the place branding value of the space and also reinforces the value of both the protected and subsequently unprotected historic built fabric of the block. The reuse of these buildings in turn is a sustainable strategy by reducing the energy of new construction, conserving natural resources and reinforcing the cultural value for people to live and work in the district.

##### Criteria: Location, Size and Number

To abstract and quantify this qualitative experience of associating historic form with open space, three criteria were identified as indicators of this general relationship: location, size and number. While the parametric system focuses on the unit of one block, the relationships in fact operate across blocks, namely across the public right-of-ways of streets. For this purpose parametric definitions, the term for scripting interface in Grasshopper, were developed at first within one block.

It was important to be reminded that the analytical value of this tool was not to make suggestions of

holistic architecture nor urban design but rather a tool to reveal patterns based only on the parametric criteria built into the system.

Location: a simple parametric relationship was set up to attract open space to historic building.

Size: a simple parametric relationship was setup to match the size of the open space with the historic building.

Number: Given the 10% total open space but not knowing its number of distribution, the last parameter relates the number of evaluated historic building massing with the number of open spaces generated to equal 10% of the total block area.

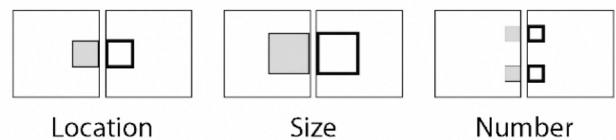


Figure 1. Historic / Open Space, Three Criteria, students I. Kostic & B. Prager.

These three simple and abstract relationships were tested within a one block system. To converge all three parametric criteria and use a real world block to test the system, the use of optimization was used to recommend an ideal solution to with real world external force data and the given block unit/organization. The Galapagos plugin for Grasshopper computes and visualizes over time the possible solutions, arriving at a final optimal solution.

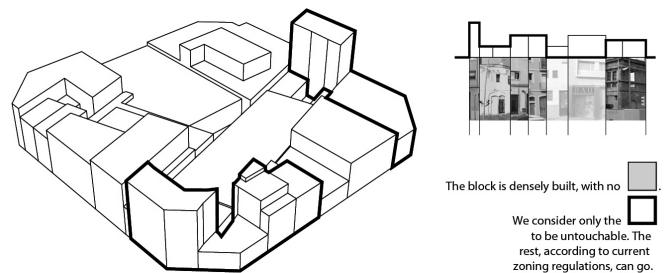


Figure 2. Historic / Open Space, Protected Historic Fabric, students I. Kostic & B. Prager.

The project team used a given site bound by Carrer de Pujades to the north and Carrer de Lull to the south, and Carrer de Avila to the west and Carrer de Badajoz to the east. The irregular buildings were regularized for the exercise. A total nine-block set was used including one adjacent block in all directions.

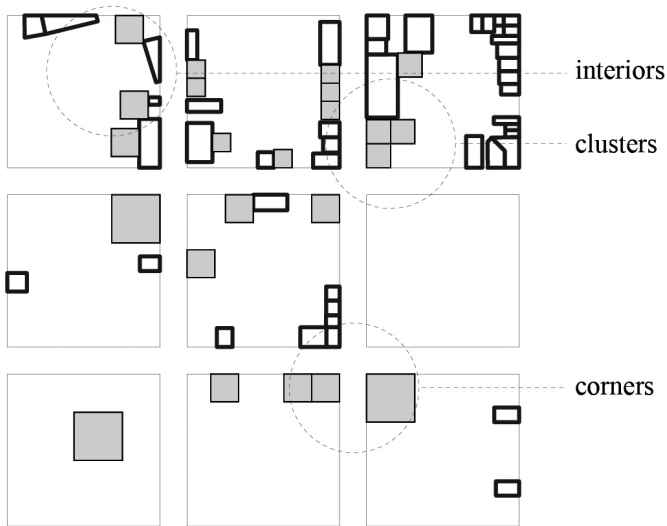


Figure 3. Historic / Open Space, Galapagos Optimization, students I. Kostic & B. Prager.

#### 4.2 Emergent Patterns

The resulting optimization proposal highlighted three emergent patterns: 1) clustering spaces; 2) corner spaces and 3) interiors (block patios). The analysis also made more observable new relationships such as the scale of walkability between open spaces and whether this scale would be more supportive of an emergent organization of a networking of connective nodes of open space or isolated islands of open space that are more disconnected across the district.

### 5 ADDITIONAL URBAN ANALYSIS TOOLS

Parametric Places tools were also developed with respect to place branding identity of food and cultural use of open space. The following tools demonstrate similar parametric criteria identification methods as the Historic/Open Space tool. In each project qualitative cultural identity is analyzed via quantifiable indicators characteristic of the place.

#### 5.1 Food Market @22

Food, like *modernisme*, is a central feature to the place brand identity of Barcelona. The MMBL Mercats de Barcelona network of thirty-nine public food markets provides fresh local and distant food to walkable neighborhoods in the City of Barcelona (Mercats 2013). As a previously industrial district area, 22@ has no public food markets, with an area that could support up to three such markets. Previous research within the I|c|a:BCN Public Food Markets Network investigated how food distribution may provide connectivity between 10% open spaces.

Trends in food activities types are shifting in Barcelona due changes in business hours, commuting times and immigration patterns from the traditional

siesta two-hour lunch period and five-meal day, to a more business focused one-hour lunch and three major meals. The Food Markets 22@ tool visualizes different types of food activities at any chosen location. Food activity types include bakery, cooked/prepared foods, meat shop, wine store, fish story, grocery, fruits and vegetables, restaurants and bars. The tool uses food activity at store hours and real-time data in visualizations.



Figure 4. Food Market @22, students J. Stattler & Y. Yu

The food visualization tool also identifies parametric criteria of walkable scale. The radius of a 500 meter walking distance would be adjustable by individual users based on comfort. The radius may also be adjusted for topography. Qualitative cultural design objectives are quantified through more quantifiable indicators, in this case food establishment types, time, distance and topography. The project highlights Bruno Latour's idea of the attachment of design in real-time to its site (Latour & Yaneva 2008). Like other tools of the Parametric Places research this tool provides visual analysis of existing behaviors allowing urban design to better respond to changing patterns of use and place brand over time.

#### 5.2 Cultural Use of Public Space

The use of public space in Barcelona has been attributed to a long history of cultural events, pueblo participation and climactic accessibility to exterior space. The tool Cultural Use of Public Space relates the size of the 10% open space to the adjacent distance to large public spaces such as large parks and the water front recreational spaces in Barcelona.

The tool first analyzes the relation between the sizes of public open space the cultural use that it supports. Based on this understand the tool builds a relationship between distance and size: the closer the 10% open space is to a large public space, the most dispersed the 10% unit block open space breaks up to support smaller activities. The farther the 10% open space is the more that space attempt to whole and large to support larger activities. Other criteria and complexity would be needed to match the complexi-

ty of the qualities of cultural use of public space but this tools provides a possible missing analysis in the guidelines of how the 10% open space me be used in regard to cultural use.

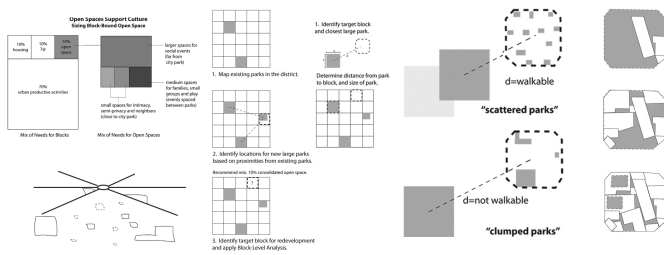


Figure 5. Cultural Use of Public Space, students J. Barak & C. Hagerman

### 5.3 Place Branding Value and Intelligent Manufacturing

The three tools under the Parametric Places research use intelligent design methods to support the historic manufacturing context. They reveal synergistic values to the place brand of a location. Consider that ‘the important thing to realize about branding a (place) is that it must be an amplification of what it is already there and not a fabrication’ (Gilmore 202). These tools do not create new place brands or new economic and sustainable value but reveal the latent value that preexists in a site. The complexity of urban systems, the variety of criteria and the large data sets at the scale of districts and cities have provided relative resistance when compared to the use of parametric design and qualitative indicators at the scale of individual buildings.

If these tools can identify and provide a metric for analyzing historic materiality at the scale of the block and district, then with the right metric they may also serve to consider the inclusion of materiality of new construction as well in urban design tools. The focus on protected historic buildings has provided an advantage in this specific research for energy and material conservation based on existing cataloged building data but this would not likewise preclude the additional inclusion of performative criteria at the scale of districts as is currently being researched by others.

## 6 CONCLUSIONS

Urban analysis tools used for measuring place branding and sustainability value are presented. These tools rapidly evaluate urban design relationships with regard to existing and future building material manufacturing methods and augment existing non-traditional guideline planning strategies such as the 22@ guidelines for open space, protected residential use, services use and protected historic buildings.

With increased complexity of systems understandings of cities and the increased recognition of place branding value of identity of districts, urban analysis tools should be developed that inform designers during the planning criteria process and during the individual lot build out negotiated during the block and district development period. It is envisioned that Parametric Places research tools such as the Open Space/History, Food Market @22 and Cultural Use of Open Space tools could guide city politicians, planners and designers toward synergy-oriented design of new urban spaces and the reuse of existing districts in a way that captures latent place branding value of a location.

The use of parametric design in urban design at the scale of the district and block enhances the holistic design of urban space. Once existing manufacturing methods are destroyed, they are often lost forever. Multi-objective optimization criteria could be used for complex urban design conditions including reuse. These intelligent tools would support a new generation of sustainable design, where values of the past inform environments of the future.

## 7 REFERENCES

- 22@ Barcelona: 10 Years of Urban Renewal. 2010. Barcelona: Ajuntament de Barcelona. 30.
- Barcelo, M. 2001. *La Ciutat Digital, Pacte Industrial de la Region Metropolitana de Barcelona*. Barcelona: Beta Editorial. 193.
- Gilmore, F. 2002. A Country - Can it be repositioned? Spain - the success story of country branding. In *Brand Management Vol 9*, No 4-5. Henry Stewart Publications: London. 281-293.
- Barcelo, M. 2001. *La Ciutat Digital, Pacte Industrial de la Region Metropolitana de Barcelona*. Barcelona: Beta Editorial. 193.
- Latour, B & Yaneva, A. 2008. Give Me a Gun and I Will Make All Buildings Move: An Ant's View of Architecture. In R. Geiser (ed.), *Explorations in Architecture: Teaching, Design, Research*. Basel: Birkhäuser. 80.
- Mercats de Barcelona, 2013. [www.bcn.cat/mercatsmunicipals](http://www.bcn.cat/mercatsmunicipals). Ajuntament de Barcelona.
- Monza & Brianza 2012. Monza & Brianza Chamber of Commerce & Anholt Brand Index.
- Speranza, P. 2012. Place Branding from the Bottom Up: Strengthening Cultural Identity through Small-Scaled Connectivity. *Conference Proceedings: Roots-Politics-Place*. Berlin: inPolis. 237-252.
- Speranza, P. 2013 Catalan Nation Building and Bottom-Up Placemaking: Placemaking and Barcelona Coastal Redevelopment in the 22@. *International Association for the Study of Traditional Environments, The Myth of Tradition, Volume 242*, 2013. Traditional Dwellings and Settlements Working Paper Series. Berkeley: IASTE.
- Rutten, D. 2007 (1<sup>st</sup> ed.). *Grasshopper & Galapagos*. Seattle: Robert McNeel & Associates.
- Vitiello, R. and Willcocks, M. 2006. The Difference is in the Detail. *Place Branding Vol. 2, 3*, 248-262.