

Barcelona: A Roman Village Becoming a Smart City

On July 2, 2014, Josep Ramon Ferrer, director of the ICT and smart city strategy at Barcelona City Council, and his team finished the second round of meetings with the companies selected to participate in the competitive dialogue to create City OS. The idea came from a simple question:

“We imagined the city as a mobile phone: Why can’t we have a city that works with an operating system based on standards that interact with the hardware (whatever it is) and software (any app)?”¹

Ferrer is a telecommunications engineer and began his career in the private sector. In 1996 he started working for the Catalan government (Generalitat de Catalunya), where he moved through several management positions related to telecommunications and was finally appointed director of strategy for telecommunications and information technology. After working for the Generalitat, he moved to the Barcelona City Council, where he served as director of ICT and smart city strategy for the council’s Municipal Institute of Information Technology. There, he led one of the major projects in Barcelona’s smart city strategy: City OS, the city operating system.

City OS aimed to provide the City Council with the ability to acquire and process data from urban operations in a rapid, efficient, effective and sustainable way. The platform was equipped with business intelligence to analyze and relate events in order to allow the city managers to conduct simulations as well as predicting and anticipating emergency situations. It was also intended to help with real-time decision making in order to meet the needs of the government and improve quality of life. City OS was one of the most visible, complex and key projects in Barcelona’s smart city strategy and it was embraced as part of a broad vision and framework encompassing several areas of the city.

¹ Interview with the authors. All further unattributed quotes are drawn from interviews carried out by the authors.

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At the international level, much attention was being paid to the process that motivated Barcelona to create a real smart city. There was particular interest in how the strategy was going to be implemented without Barcelona losing its idiosyncrasy as a Mediterranean city. Also, implementing the strategy was not just a matter of considering the benefits; it also meant balancing the problems and risks involved in such an innovative city-wide strategy.

On the other hand, there were the business interests. How did companies react to the City Council's needs and conditions? How did they manage the negotiation and partnership with other companies (some of which were direct competitors)? What were the strategic opportunities for each company in the provision of City OS? How did they design a go-to-market strategy for a product that could have been too narrowly adapted to Barcelona's specific needs? How were the sales and distribution of profits to be handled in a shared solution, not only between companies, but if the intellectual property was also shared with the public administration? To what extent did the Barcelona "brand" compensate for an underpaid project?

Barcelona

Barcelona is the capital city of Catalonia (one of Spain's 17 autonomous communities) and Spain's second-biggest city. Barcelona province is the key region within Catalonia and, even though it covers only 7,728 square kilometers out of Catalonia's 32,114 square kilometers, it was home to 74% of Catalonia's population in 2011. Barcelona's density and economic integration make it Spain's second-biggest metropolis after Madrid (see Exhibit 1).

The Barcelona metropolitan area is home to more than five million inhabitants. In contrast to other cities, where the majority of the population lives within the boundaries of the administrative city, most of Barcelona's residents live on the outskirts of the city's administrative boundaries, which is a challenging situation for the municipal government.

If we take a look at the administrative definition of Barcelona, there are more than 1.6 million people squeezed into 102 square kilometers of Barcelona proper. This equates to a population density of close to 16,000 inhabitants per square kilometer, making the city of Barcelona one of the most densely populated areas in Spain and in Europe.

Over the past few decades, it has won a reputation for being a dynamic city with good quality of life² and, more recently, it was listed in a ranking of top smart cities.³ Despite this recent recognition, Barcelona has experienced many ups and downs during its nearly 4,000 years of history. Its past has determined what Barcelona has become and shapes what it wants to be, so it is important to take a look back in time.

A Little Bit of History

The history of Barcelona goes back more than 4,000 years; the earliest remains that have been found date back to the late Neolithic period. Legend has it that the Carthaginian leader

² Cushman & Wakefield, "European Cities Monitor 2010," 2010.

³ <http://www.fastcoexist.com/3024721/the-10-smartest-cities-in-europe>, last accessed July 2014.

Hamilcar Barca, father of the well-known Hannibal Barca, founded the port of Barcino (deriving its name from the Barca family) around 230 BC and that, later, the name Barcino was used by the Roman empire and eventually gave rise to the name Barcelona. Despite the legend based on the names' similarities, in truth the name Barcelona is derived from the Iberian name "Barkeno."⁴

Barcelona 1.0

Under the control of Rome, led by Emperor Augustus (27 BC to AD 14), the name Barcino was formalized (between 15 BC and 10 BC). During that period, the city grew in the shadow of its neighboring city, Tarraco (now Tarragona), an important urban center in the Roman empire. Despite this, it gradually increased in wealth, mainly because it was favored with an excellent harbor. After the end of the Roman empire and under the control of the Visigoths in the early fifth century, the city achieved the status of "capital of Hispania" several times, due to its great geostrategic positioning in both political and commercial terms.

Two centuries later, the city was conquered by the Arabs and then by Charlemagne's son Louis, who established the Carolingian "Marca Hispanica," ruled by the count of Barcelona.

Barcelona 2.0

As the counts of Barcelona were conquering territory (they came to dominate all of Catalonia), they gained political and economic power. After the Catalan and Aragonese dynasties joined through marriage, their territories – known as the Crown of Aragon – expanded beyond the Iberian Peninsula, covering areas including Naples, Sicily and Athens in the 13th century. Despite the territorial expansion and its consequent political and economic expansion, the dynastic union between the Crown of Aragon and the Crown of Castile marked the decline of Barcelona.

Barcelona 3.0

The Barcelona region reemerged in the 18th century due to industrialization. The Industrial Revolution quickly spread in Catalonia, which was the pioneer region of Spain when it came to implementing manufacturing processes brought from Britain. As it was developing industrially, Barcelona implemented one of the most important urban projects of the 19th century: the Eixample, the materialization of the Cerdà project.

Again, the Catalan capital regained a central role in the economic development of Spain, which led to the revival of Catalan culture through various forms of expression such as poetry and other forms of literature and, particularly in Barcelona, urban development, architecture and modernism. The work of Antoni Gaudí (Park Güell, Casa Batlló, Casa Milà and the Sagrada Família), Lluís Domènech i Montaner (Hospital de la Santa Creu i Sant Pau, Palau de la Música Catalana) and Josep Puig i Cadafalch (Casa Amatller) greatly boosted the city's image.

⁴ M. Dietler and C. López-Ruiz, *Colonial Encounters in Ancient Iberia: Phoenician, Greek, and Indigenous Relations* (Chicago: University of Chicago Press, 2009).