Chapter 2
The Use of ICT in Planning Practice:
Contributions to an Effective Link between Real and Virtual Cities and Territories

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ABSTRACT

The use of information and communication technologies (ICT) in spatial planning is contemporary of the development of computers, and has benefited from the possibilities that ICT brought in terms of data processing and visualisation, with the development of geographical information systems (GIS) being the most successful and widespread example of this relationship. Today, there is a myriad of new ICT being developed based on the existence of a large and affordable computational capacity and on the seemingly infinite data made available. And yet, there is still (and there is scientific evidence of) a large gap between the research and development of ICT and their effective use in the professional practice in planning. In this chapter, the authors discuss the main roots of this gap and present some of the main challenges that researchers and practitioners will face to take advantage of the resources available to effectively reduce that gap.

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INTRODUCTION

Virtual cities and territories[1], the main theme of this book, is a concept that is long embedded in the planning theory and practice. The very concept of urban and spatial planning (from now on referred to as spatial planning) implies the conceptualization of desired futures that are not materialised beforehand, implying a virtualisation through a series of visualisation elements that allow planners, decision-makers and citizens to better understand what planning options and processes are at stake. This virtualisation was made in the past by using maps, sketches, artist visualisations and many other drawing-based elements, all of which using paper or other tangible material. It is made nowadays using the very same elements in their digital form, produced by increasingly powerful computational resources. Still today, the use of paper-based graphical elements to create those virtualisations is very popular, among architects, to give just an example.

Cities and their surrounding territories, agricultural and natural spaces, in a broader sense natural/human landscapes at their various scales, are very complex systems that are, no doubt about this, the evolutionary convergence between nature and civilisation. Even the most planned and designed cities and landscapes are the result of some kind of planning process that is aimed to create a more or less liveable human habitat.

These systems were perceived in many different ways throughout spatial planning history. From a more design oriented spatial planning (or, many times, merely urban design) of cities and territories as it was the practice in the 19th century with many of the industrial cities (and even prior to that with the colonial cities), to new attempts to understand them as the result of more complex interactions, as Ildefonso Cerda's Eixample in Barcelona (Puig & Cerdá, 1999) or Ebenezer Howard's garden cities in the United Kingdom (Howard, 2001), spatial planning evolved from the necessity of expanding (and also building new) cities to accommodate urban expansion towards the necessity of controlling that expansion, especially after the great world wars.

At the same time, there was an emerging interest in cities and territories from social sciences with an emphasis on urban economics, as it is the case of the Central Place Theory by Christaller (Christaller, 1933; Christaller & Baskin, 1966) or Alonso's land rent theory (Alonso, 1964). This new perspective on how cities and territories work as socioeconomic constructions brought a whole new scope to spatial planning. Virtualisation of cities and territories was from then on not only focusing on the physical spatial design, but also aiming to represent the underlying phenomena that rule socioeconomic evolution of cities and territories.

Form – the physical space – and function – the socioeconomic dynamics that take place in that space – were combined and new ways of representing both were used.

Planning approaches also evolved during the early- to mid-20th century from static perspectives of cities and territories, possibly a consequence of both decades of design-based planning and lack of resources to analyse significantly large datasets (that were already becoming more available and scaling), to the incorporation of dynamics, the inclusion of time as a main pillar of spatial evolution. This brought new possibilities and needs for virtualising cities and territories, and their spatial and temporal dynamics.

As spatial planning was becoming an increasingly more multidisciplinary area of both knowledge and practice, computational science and technology was developed.

Very briefly, computational theory was developed in the 1930s with the work of Alan Turing (Turing, 1937) and modern computers were invented in the 1940s, with the famous Colossus used by the British government to decode the German Enigma code and its counterpart ENIAC built at

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