

# Chapter 1

## Introduction



**Keywords** Cities · Disciplinary history · Manual · Urban form · Urban morphology

### 1.1 Motivation

Very few things give me as much pleasure as walking, for the first time, through the streets of a city. The moment, when I leave the hotel in the first morning, usually carrying a map, a sketchbook, and a camera, has an intense meaning for me, representing the beginning of the discovery of the city... this magnificent creation of mankind. That morning and the following days are of intense learning. I try to leave the hotel as early as I can, and to arrive as late as possible. In the numerous walking trips, I take some photographs, quick sketches, and brief written notes. Leaving a city is always sad, even knowing that my beloved city, Porto, will always be waiting for me. Sometimes, I return to the visited city earlier than expected. On these occasions, I always take the map that I have used in my first visit and continue to ‘draw all the visited streets’. It is good to know that there are always new lines to be drawn...

As my passion for cities continued to grow, taking an increasingly central place in my academic and research work, I have realized, with some perplexity, that there were not many textbooks on the study of the physical form of cities. Initially, I thought that this was a lack of knowledge, but quickly, through my research work and contacts with Portuguese and foreign colleagues, I have acknowledged that there is indeed an absence of manuals on urban morphology.

The book has this specific goal, to be a manual... able to introduce the reader into the wonderful world of the study of physical form of cities. In this sense, the book is firstly directed to researchers, academics, and students of M.Sc. and Ph.D. courses where urban morphology is a fundamental theme, including geography, architecture, planning, engineering, and also history, archaeology, and sociology. It is also directed to professionals who, in a systematic way, deal with the physical

form of cities: planners, urban designers, architects, engineers, and others. Finally, this book is for all those who are interested in cities, and who, like me, always want to learn something more about ‘the most complex of human inventions’ (Levi-Strauss, 1955). To achieve this goal, I have tried to make a simple and small book, using an easy language. This does not mean simplification of contents, but of how these are communicated—highlighting the essential and eliminating the superfluous elements.

My personal experience is reflected in the book: from my first training in architecture to my daily work in the *Centro de Investigação do Território Transportes e Ambiente* (CITTA), to the intense debate in the two morphological research networks in which I am most deeply involved—the International Seminar on Urban Form (ISUF) and the Portuguese-language Network of Urban Morphology (PNUM), and to the indispensable trips into the different cities that I had the pleasure to visit.

## 1.2 Object of the Book

This book is about urban morphology. It is hard to find shared definitions, by different morphological approaches, of ‘urban morphology’ and ‘urban form’. The book draws on the basic definition that urban morphology means the study of urban forms, and the agents and processes responsible for their transformation; and that urban form refers to the main physical elements that structure and shape cities—streets (and squares), street blocks, plots, and common and singular buildings, to name the most important. The theme of the different elements of urban form will be developed in detail in the second chapter. In this book, the word ‘city’ is used in its wider sense, encompassing most human settlements.

The word morphology was first proposed by Johann Wolfgang Von Goethe (1749–1832), the famous German writer and thinker, who devoted part of his work to biology. Goethe used the word morphology to designate the ‘science that deals with the essence of forms’. Although it was proposed as a branch of biology, the general and abstract nature of morphology enabled its application in many different fields. Table 1.1 shows a set of definitions of urban morphology proposed by different authors.

Despite the reduced number of manuals (the book ‘Handbook of Urban Morphology’, published one year after the 2016 edition, must be highlighted in this context—Kropf 2017), there are many texts on various aspects of urban morphology. Faced with the impossibility of bringing all these into the debate, I had to make some choices. This book is particularly informed by papers published in scientific peer-reviewed journals written in the English language. These papers have three fundamental advantages as a source of knowledge: updated information, scientific validation, and consideration of local issues under a wider framework. Yet, emphasizing these advantages does not mean that a significant disadvantage, underlined by authors such as Jeremy Whitehand or Michael Conzen, is ignored: it is easier for an English native speaker to prepare a text in this language. This leads to the existence, in these journals, of what the two authors describe as ‘anglophone squint’

**Table 1.1** Definitions of urban morphology (Marshall and Çalişkan 2011)

	Definition	Source
General	<p>‘The study of urban form’</p> <p>‘The science of form, or of various factors that govern and influence form’</p> <p>‘The study of the physical (or built) fabric of urban form, and the people and processes shaping it’</p> <p>‘Morphology literally means form-lore, or knowledge of the form...what is the essence of that form; does certain logic in spatial composition apply, certain structuring principles?’</p>	<p>Cowan (2005)</p> <p>Lozano (1990)</p> <p>Urban Morphology Research Group (1990)</p> <p>Mayer (2005)</p>
Focus on the object of study (urban form)	<p>‘...an approach to conceptualising the complexity of physical form. Understanding the physical complexities of various scales, from individual buildings, plots, street-blocks, and the street patterns that make up the structure of towns helps us to understand the ways in which towns have grown and developed’</p> <p>‘Urban morphology...is not merely two dimensional in scope. On the contrary, it is through the special importance which the third dimension assumes in the urban scene that much of its distinctiveness and variety arise’</p>	<p>Larkham (2005)</p> <p>Smailes (1955)</p>
Focus on the manner and purpose of study	<p>‘A method of analysis which is basic to find(ing) out principles or rules of urban design’</p> <p>‘...the study of the city as human habitat...Urban morphologists...analyse a city’s evolution from its formative years to its subsequent transformations, identifying and dissecting its various components’</p> <p>‘First, there are studies that are aimed at providing explanations or developing explanatory frameworks or both (i.e. cognitive contributions); and secondly, there are studies aimed at determining the modalities according to which the city should be planned or built in the future (i.e. normative contributions)’</p>	<p>Gebauer e Samuels (1981)</p> <p>Moudon (1997)</p> <p>Gauthier e Gilliland (2006)</p>

(Conzen 2011; Whitehand 2012). However, it also seems fair to say that in most scientific journals in this field of knowledge, a paper is not rejected by the lack of quality of English writing.

Books and unpublished doctoral thesis deserved special attention in the construction of this manual. In these cases, language proved to be a barrier: only texts in English, French, Italian, Portuguese, and Spanish were considered. Finally, communications in scientific conferences in this field of knowledge—such as the International Seminar on Urban Form, the International Space Syntax Symposium (ISSS), and the Portuguese-language Network of Urban Morphology—were considered and incorporated in the book.

### 1.3 Structure of the Book

The book is in nine chapters. After this brief introduction, the second chapter focuses on the different elements of urban form. The presentation of these elements follows an order of increasing the resolution of urban form. It starts with a description and explanation of different urban tissues that we can find in our cities. It then moves to the natural context and, increasing the resolution, to the system of public spaces that constitute each urban tissue, analysing both the spaces for circulation and permanence. The chapter moves then to plots which are, in most cases in our cities, the physical expression of individual property and, as such, distinct from the public or collective space. Once again, increasing the level of resolution, the chapter moves to buildings constituting the urban tissues of a city including not only singular buildings but also common buildings.

The third chapter focuses on the different agents and agencies responsible for, and the complex processes of, urban transformation. It analyses how each one of us takes part in the process of transformation of the urban landscape: as a promoter of an action of transformation of urban forms, as an architect responsible for the design of new physical forms, as a builder of these forms or, in a more indirect way, as a planner designing a city vision and guiding private activity in his day-to-day practice of development control, or as an elected politician defining a political strategy for the city. In addition, the chapter aims at understanding the processes of urban transformation: how do we organize ourselves as a society to build a balance between a comprehensive view of the city, usually a planned view, and a number of different contributions, eventually associated with a higher spontaneity. It is argued that this balance between unity and diversity is essential in a city that wants to be attractive, in morphological terms.

After introducing the main objects of study in urban morphology—the urban forms, agents, and processes of transformation—the fourth chapter analyses the evolution of cities over history. The structure of the chapter draws on seven historical periods that are relatively consensual for different researchers: (i) early cities, including Sumerian, Egyptian, Harappan, Chinese, Aztec, Mayan, and Inca, (ii)

Greek cities, (iii) Roman cities, (iv) Islamic cities, (v) Mediaeval cities, (vi) Renaissance cities, and finally, (vii) nineteenth-century cities. The main goal of the chapter is to understand how the main elements of urban form were combined in each of these periods, and what the main characteristics of these elements were.

The fifth chapter addresses contemporary cities, investigating the main city-building processes and including both inherited and emerging urban forms. It focuses on urbanization processes since the mid-twentieth century, exploring the progressive growth of urban population and its distribution by cities of different sizes. The chapter has a particular focus on megacities (cities with more than ten million inhabitants) and on three distinct examples, with different weaknesses and threats, and with specific strengths and opportunities: Istanbul, Tokyo, and New York. For more than 1500 years, Istanbul (Constantinople) was the capital of the Roman, Byzantine, and Ottoman Empires. After the partition of the Ottoman Empire, in 1923, a new country was established—Turkey—and Ankara became the new capital. Yet, Istanbul has never lost its fundamental role. From central Fathi to the peripheral districts of Sile (East) and Çatalca (West), the metropolitan area of Istanbul is inhabited by fifteen million inhabitants. At the end of the twelfth century, Tokyo (Edo) was established as a small castle town, occupying part of the area of present-day Imperial Palace. In the early seventeenth century, it had about one million residents, being one of the largest cities of the world, and in 1868, Tokyo became the capital of Japan, succeeding Kyoto. The city suffered major destruction in the mid-1920s, due to the earthquake, and in the mid-1940s, due to the Second World War. But in 1950 Tokyo was, together with New York, one of the two megacities in the world. Today, with almost 40 million inhabitants, Tokyo metropolitan area is the largest in the world. Founded in the early seventeenth century by Dutch settlers, New York has been continuously growing, in a remarkable process of urban evolution, marked by the 1811 plan (establishing its orthogonal layout), which culminated in today's magnificent city, structured in five main areas (Manhattan, Brooklyn, Queens, Bronx, and Staten Island), and a great metropolitan area that is the place of residence for more than eighteen million inhabitants. With more than one million people and with a remarkable urban history and built heritage as expressed by UNESCO classification, Marrakesh (one of the four imperial cities of Morocco) and Porto are the focus of the last part of the chapter.

After the first set of chapters that focus on the object (the city), the sixth chapter changes the emphasis to the researcher (the urban morphologist). The chapter is in three parts. The first part addresses a few works that are classics in urban morphology and urban studies. The first of these books was written in the late 1950s, five books were prepared in the 1960s, two were written in the late 1970s, one was prepared in the early 1980s, and the last one in the early 1990s. The ten books are *Studi per una operante storia urbana di Venezia* by Saverio Muratori; 'Alnwick Northumberland. A Study in Town Plan Analysis' by MRG Conzen; 'The Image of the City' by Kevin Lynch; 'Townscape' by Gordon Cullen; 'The Death and Life of Great American Cities' by Jane Jacobs; *L'architettura della città* by Aldo Rossi; *Formes urbaines: de l'îlot à la barre* by Jean Castex, Jean Charles Depaule and Philippe Panerai; 'A Pattern Language' by Christopher Alexander and his colleagues; 'The Social Logic of Space' by Bill Hillier and Julienne Hanson; and, finally, 'Fractal Cities' by

Michael Batty and Paul Longley. The second part of the chapter presents the main morphological approaches that have been developed over the last decades, from the historico-geographical approach (promoted by the Conzenian School) to the process typological approach (promoted by the Muratorian School), from space syntax to the various forms of spatial analysis (including cellular automata, agent-based models, and fractals), and also a number of emerging approaches. Finally, the last part of this chapter introduces a key topic—the need to develop comparative studies. The knowledge of the strengths and weaknesses of each approach will certainly enable those who want to develop a morphological study, to select the most appropriate options given the specific nature of the object under analysis.

The seventh chapter focuses on a fundamental issue for the field of urban morphology that has been receiving increased attention in the literature, the passage from description and explanation of the morphological phenomena to the definition of prescriptive guidelines to produce new urban forms. Two eminently practical activities that can benefit from morphological support are identified: urban planning (and urban design) and architecture. While the first is a potential receptor of morphological theories, concepts, and methods developed for the city scale, the second would be informed by morphological approaches developed for the building scale.

The eighth chapter addresses the contributions of urban morphology to fundamental dimensions of our collective life in cities, in particular the social, economic, and environmental dimensions. Bearing in mind the practical achievement of this purpose, five specific issues from these three generic dimensions are selected: public health, social justice, heritage tourism, climate change, and energy. The chapter discusses how to strengthen the channels of communication between each of these issues and the field of urban morphology.

Finally, the ninth chapter presents the main conclusions of the book, somehow bringing together the synthesis presented in each of the previous chapters and reflecting on the work as a whole. This chapter includes the identification of a few lines for future research within the science of urban form.

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