Chapter 10
Space Syntax Theory and Its Contribution to Urban Design

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ABSTRACT

This chapter presents the theory of space syntax and its contributions to urban design. The theory, introduced in 1984 by Hillier and Hanson, refers to a set of principles and techniques to investigate and reveal the characteristics of urban settlements via concrete measures. In this regard, the current chapter is divided into several sections. The first section demonstrates the space syntax theory at both conceptual and methodological levels. In the second section, the measures of connectivity, integration, choice, and intelligibility are discussed, and linked to the traditional urban values such as accessibility and legibility the traditional urban values. In the third section, types of space syntax analysis are discussed, in addition to their importance and their application potentials. This chapter demonstrates the contributions of space syntax theory to urban design and architecture. This finding provides a potential mechanism for explaining how the theory succeeded in presenting numerical and concrete measures to reveal what have been intangible values of urban settlements such as legibility and accessibility.

INTRODUCTION

Space syntax represents one of the seminal theories in both urban design and architectural realms. The theory focuses on analyzing the spatial structure in all its diverse forms, cities, settlements and buildings, to investigate the relationship between human societies and space organization. Despite that some of the theory foundational concepts were envisaged in the mid-1970s by Hillier and Leaman, the theory was formally introduced in 1984 by Hillier and Hanson in their book "The Social Logic of Space". The authors were motivated by the desire to find a concrete methodology to describe, represent and quantify the spatial structure of settlements or buildings that map the relation between society and its urban and architectural forms. In their book, Hillier and Hanson demonstrated the main concepts, paradigms and measures of the theory, which were developed later by Hillier (1996a) in his seminal book "Space is the Machine". In this sense, the theory can be defined as a set of techniques to represent, quantify and

interpret the spatial structure - termed as a spatial configuration in the theory literature – of both urban and architectural forms, so their underlying social logic can be enunciated (Bafna, 2003).

According to the theory, by analyzing the spatial structure, which in itself carries social information and content for a given settlement, the morphological features of its urban form should be disclosed, and the social relations can be mapped (Hillier and Hanson, 1984; Hillier et al., 1987). Also, the configuration of the spatial structure of a given settlement might influence the way its inhabitants and visitors use and perceive it (Penn, 2003; Hillier, 1996a). In this regard, the theory has the competence of mapping the impact that spatial structure, or spatial configuration, has on social life, encountering and movements in urban and architectural spaces (Netto, 2016).

SPACE SYNTAX THEORY AT THE CONCEPTUAL LEVEL

The departure point of space syntax theory is to build up a conceptual model that investigates the society-space relationship on the basis of the social content of spatial patterning and the spatial content of social patterning (Hillier and Hanson, 1984). This base or paradigm denies the simple notion of space-as-form and society-as-content. However, this base stresses on the social structure as inherently spatial, and the spatial structure has a fundamental social logic (Bafna, 2003). Therefore, the space syntax paradigm bridges the static narrative of society and space as discrete entities to a more dynamic discourse: each mutates and reforms the other. To tackle this dynamic discourse, two main challenges had to be addressed: identifying the nature of the spatial structure at the conceptual level, and how to describe, quantify and interpret its latent socio-spatial qualities at the methodological and operational levels. Here, the author discusses how the theory addressed the first challenge while the second challenge is discussed in the next section.

To identify the nature of spatial structure at the conceptual level, the theory mapped out two important premises. First, the spatial structure in all its forms, cities, settlements or buildings, is not a by-product of some extraneous determinative factors such as topography or climate, or by society kinship systems or mythologies (as reported by structural anthropologists) or by the biological desire of individual to identify a clear "territory" (as the Territoriality theory states) (Hillier and Hanson, 1984). Rather, the theory conceptualizes the spatial structure as a discrete entity that holds within itself both the construction rules (the genotype of the pattern) and final form (the phenotype of the structure). In this regard, the theory denies the previous approaches such as territoriality theory for Newman and cognitive studies of Lynch; arguing that these studies failed to offer an operational description and focused on the behavioral reaction of individuals towards their built environment rather than on the space as an autonomous entity (Hillier and Hanson, 1984).

Moreover, the theory argues that it is only the urban grid configuration which can influence the patterns of movement and the distribution of important buildings as reported in the natural movement theory coined by Hillier et al. (1993). As shown in Figure 1, the configuration of the urban grid (C) influences both movement patterns (M) and attractors (A). Alternatively, movement patterns and attractors have no effect on the grid configuration since the grid configuration existence precedes theirs. Thus, when agreement occurs among configuration, movement and attraction, the configuration is assigned to be the primary cause for such agreement. As a result, 'natural movement' was defined as the proportion of pedestrian movement of each street or axial line resulting from the urban grid configuration itself rather

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