URBAN MORPHOLOGY GROWTH MODEL FOR THE 21ST CENTURY CITY.

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ABSTRACT

Models have been put forward to explain the complexity of the urban landscape, however urban morphology has not been included in these models. In response to this knowledge gap, the urban morphology theories of Caniggia and Conzen are explored as the basis for an urban morphology model of the 21st Century City.

Conzen and Caniggia both considered both the vertical and horizontal development of the urban landscape. Conzen studied how the land is transformed from being rural to becoming a town, how the subdivisions and land use change during that transformation process, and how that affects the town plan. Conzen uses the term burgage cycle to describe the cyclic process of building development in response to changing socio-economic demands on central land in an Old Town during the Middle Ages in England (Conzen 1960). Through a typological process, Caniggia describes how the leading type develops over time. This development can often be divided into time spans (Caniggia and Maffei 2001). In order to gain a realistic view of the development of the contemporary city, it is necessary to integrate architectural and geographical concepts in urban morphology (Kristjánsdóttir 2001).

Keywords: Caniggia, Conzen, Urban morphology model, 21st Century Cities, horizontal and vertical growth

INTRODUCTION

Several models have been put forward to explain the complexity of the city. In the 1920s and 1930s monocentric models of urban land use became popular, especially with geographers and sociologists at the University of Chicago in the United States. The Burgess Model was developed by Ernest Burgess in 1925, and in 1939 Homer Hoyt published "The Structure and Growth of Residential Neighborhoods in American Cities", in which he developed Burgess's ideas further. In 1945, Chauncy Harris and Edward Ullman published a new model of the city named the 'Multiple Nuclei Model'.

At the core of research within urban morphology are the ideas of Caniggia and Conzen. Their focus was urban continuity, where layers created by successive generations mark the inherited urban landscape by changing it or adapting it, but without entirely erasing its previous layers. This paper develops an urban morphology model based on the ideological views of Caniggia and Conzen.

BACKGROUND

Conzen and Caniggia both viewed the urban landscape as a cultural landscape. Conzen considered the impact of cultural groups in fashioning and transforming the natural landscape according to their socio-economic needs. On his part, Caniggia saw the urban landscape itself as a cultural image, with its built forms a way of symbolizing or representing the values of a society and structuring its surroundings from the beginnings of the town. These two approaches are in fact different representations of space – as landscape and as built environment. The geographical perspective is concerned with place and space. It represents place as a two-dimensional space to

which certain attributes have been attached, and whose location can be shown on map. These attributes can, for example, be information about land use, social status or economic data. The architectural perspective is concerned with the built form as a symbolic structure of the cultural landscape that it is built within, looking at both the elements that form the building as well as how that building connects to other buildings to form the space within the city as a whole and create the urban landscape. It is represented in three dimensional drawings and schematics sketches. Both approaches are interested in how time affects the urban landscape, creating the history of the city.

METHODOLOGY

Within urban morphology, it is possible to identify a number of similarities in the approaches of the British and Italian schools. The key variables in urban morphology are place, built form, time and space. Place is the site and ambience that fosters and forms part of the city. The built form is in substantial part an artefact of the citizens living in the city and makes up the city, both as a complex of component parts and as a whole. Time is the process of formation, from the smallest element to the urban landscape as a whole (both vertical and horizontal). Space is what all these components create together. A closer look at each of these key variables follows.

KEY VARIABLES THAT AFFECT THE GROW AND DEVELOPMENT OF THE URBAN LANDSCAPE

Place matters in a very profound and worldly sense. It is the frame for further development. Urban morphological studies are interested in the difference that place makes and its effect on the urban landscape. In this way cities are conceived of as being unique rather than singular. In urban morphology, an important part of the concept of place is its physical and cultural implications. In terms of physical implications, place is associated with a number of related terms including environment, landscape and nature. The physical conditions of a place can in fact affect the settlement pattern and development of the urban landscape. But, even physical environment is to some extent culturally determined. Culture therefore plays a strong role in shaping place and is in fact the main component when studying the cultural landscape of the city.

Culture can be broken up into three elements: values, norms and artefacts. Values comprise ideas about what is important in life and guide other elements of culture. Norms consist of expectations for how people will behave in different situations. Each culture has different methods, called sanctions, for enforcing its norms. Sanctions vary with the importance of the norm; norms formally enforced by a society have the status of laws. Artifacts – things, or material culture – derive from the culture's values and norms (Hoult 1969, p.93). The urban landscape is a complex phenomenon that reflects all three elements of culture at different times. Together with the physical condition of the site in which the city is embedded and building type, the urban landscape can be considered a "collective project" – the result of widely shared cultural values deeply rooted in local tradition. Both Caniggia and Conzen assume a close relationship between the system of values of a society and the urban landscape.

Finally, the location of the urban landscape has to be considered in relation to other parts of the world. In his seminal paper Hartshorne (1939) argues that geography's principal aim is the study of 'areal differentiation'. According to him the world is a rich and fascinating mosaic of places, and the geographer's task is to describe and explain this 'variable character' in both human and physical dimensions. However, Castells (1996) claims the remarkable advances in transportation and telecommunications have made the world a 'global village', where the flow of people,

information and goods is increasingly breaking down the barriers that have hitherto rendered places distinct and different. Nevertheless, there is a contradiction between the genric architecture of globalization and the growing emphasis on conservation of urban and regional identities. Both Conzen and Caniggia refer to the importance of the self-awereness of society to maintaining the continuity of the urban heritage.

The built form can be viewed both as an arrangement of elements and as the smallest element of the whole urban landscape. It is necessary to understand the interrelation between the parts, and between the parts and the whole (Kristjánsdóttir, 2019). Every building increment must be chosen, placed, planned, formed, and given its detail in such a way so as to increase the number of wholes that exist in space. (Alexander, Neis, Anninou, & King 1987, p. 248). Within the architectural perspective it is more common to view the built form as an arrangement of elements created by specific rules at a certain time in history. However, the two views are not mutually exclusive, at least over time. Thus, perceptually, it may not be possible to see the forms of the built environment simultaneously as both arrangements of parts and as whole objects, but it is possible to see them so alternately (Kropf 1993, p. 11). Caniggia's table of spatial correlation shows on one hand that the smallest element of the built form is the building material, and on the other hand that the smallest element of the city is the building (Kristjánsdóttir, 2019). A larger "wholeness" is created "... by creating intermediate and smaller wholes, and by means of the different and specific relationships between the smaller wholes at different levels" (Alexander et al. 1987, p. 248). Today, urban morphologists do not limit their attention to just the built urban form; they also examine the individuals, organizations, and processes shaping the form (Slater 1990; Whitehand & Morton 2003, Gu 2001).

Time, or perhaps history, is a framework in which urban morphological events are often placed to infer cause and effect relationships. Urban morphology uses this framework to understand the past. Evolutionary urban morphology attempts to use process deductions to determine how urban landscapes develop in time – what are their trajectories through time? According to Goethe (1790), the built form is the result of the process of formation. In order to understand built environment, it is necessary to study the sequence of events resulting in the arrangement of that material. The built environment is shaped by people as a living environment, and people are shaped by the environment they live in. Therefore the built form of the urban area and the society creating it are synthesized: the urban landscape becomes a part of social geography (Whitehand 1992, p. 2). The form or structure of the built environment is the result of the whole history of building activity (Kropf 1993). The society develops certain rules on how a specific built form should be built. The rules are codified by systematic experience that has developed over time. Caniggia's concept of spontaneous consciousness descibes the condition in which every builder finds himself working in continuity with the inherited cultural experiences, and critical consciousness when these rules are broken or abandoned (Marzot 2001, p. 243). In order to understand the structure of the built environment, it is necessary to examine history. According to Gebauer and Samuels (1983), the Italian school uses the typological process method as a basis for identifying principles or rules of urban design. In Italy the typological process is used in urban design practice, especially in historic centres (Marzot 2005). There it is used to find the rules for each layer of the palimpsest that are marked in the inherited urban place, and these rules are used as guidelines for the design of a new development at that site. Caniggia elaborated the design method of reprojection by phases, essentially modeling the local, historical process of change to arrive at new design. He took a design through these phases of transformation up to a point, and then proposed buildings he expected would be the starting point for further transformations (Kropf 2004, p. 28).

Time is a concept that has a major effect on all the other key concepts in urban mophology: place, built form and space. Each society creates built forms that reflect life at that particular time.

Space arises out of the hard and continuous work of building up and maintaining collectives through bringing about different built forms."Conzen´s and Caniggia´s work is based on relations between things rather the ´real objects´ – they identify a set of relations that form a nested hierarchy" (Kropf 2004, p. 7). Curiously, however, the question of space is never raised in the theoretical texts of Caniggia and his school, even though they claim to provide a methodology for architectural and urban design. This gap in the Caniggian approach is at once its strength and its weakness. It is a strength because it breaks with the received, conventional terminology that tends to present architecture as an essentially plastic (volumetric and spatial) phenomenon. In contrast, the Caniggian approach provides a fresh perspective that sees the built environment as a complete totality in constant metamorphosis (that is, as an organism). However, the omission of the spatial element is a weakness in as much as it gives the Caniggian methodology a strangely anachronistic and distant character with regard to the central preoccupations of the architectural debate: how can one disregard what has been an explicitly established constitutive dimension of architecture and urbanism, at least since the Modern Movement? "The reader of Caniggia is thus presented with a dilemma: how is a more comprehensive understanding of the genesis of built forms possible without abandoning the specific preoccupations of architecture?" (Malfroy1997, p. 51).

In the Urban Mophology model, the geographical perspective uses the concept of fringe belts to mark the growth periods of a city. This development is presented on maps (in two dimensions) showing the area occupied by the city and the distribution of various types of land use. The architectural perspective on the same phenomenon applies the concept of leading type to find when the built form changes, marking a new growth period in the built environment.

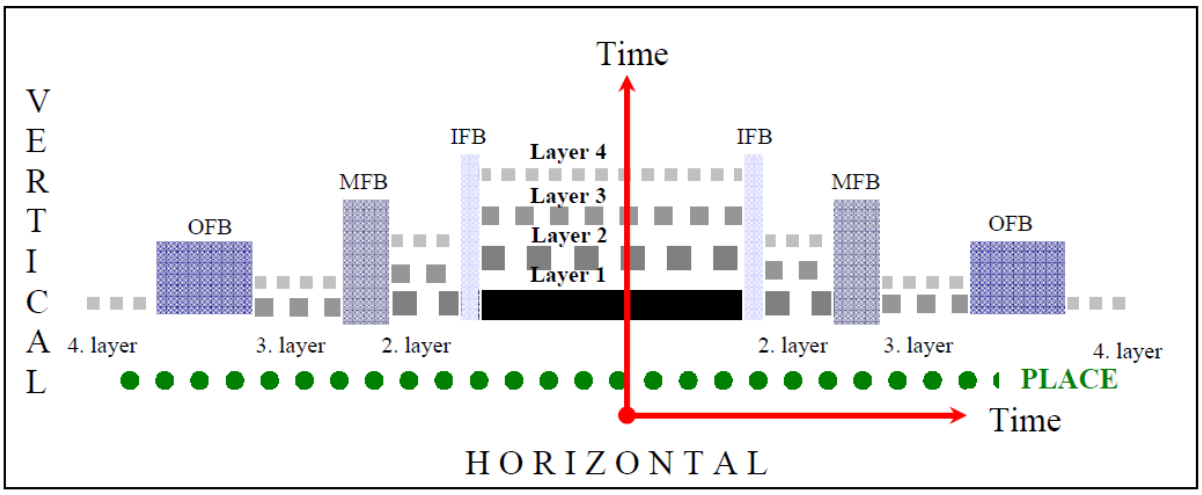

Figure 1. Urban Morphology Growth Model for the 21st Century City (Kristjánsdóttir 2007).

Time is shown on both axes, horizontal and vertical (Figure 1). The point of origin for the time axis is the beginning of urbanization. The city has expanded outward from its point of origin and as time passes it continues to expand further out. It has also adapted and grown vertically in the sense that older buildings have been adapted to new use and increased population. Houses have been expanded and new houses added, with some replacing older houses at the same site. The green dotted line at the bottom of Figure 1 indicates the place, representing local effects such as physical conditions of the site, the local culture and last but not least, the location of the site with respect to

economic and political conditions. The figure shows four layers, numbered 1 to 4, of built form and three fringe belts: IFB, MFB and OFB. The number of layers forming the palimpsest is greatest at the heart of the city, because there the longest time has passed since the original settlement of the site. The first layer of settlement becomes the center of the urban area. In a standstill period, the fringe belt is formed. After a period of stagnation, a new residential area is created. This cycle is repeated in most sizable cities with a lengthy history. However, it is important to realize that the city´s growth does not only affect the urban landscape horizontally, but also vertically. Horizontal effects refer to the land-use that is added to the urban landscape and vertical effects are the changing built form that is constructed. The new buildings located within the new land use also affect the vertical development of the urban landscape because the existing buildings are constantly being transformed according to the latest needs and standards of the society.

CONCLUSIONS

Over time the urban landscape grows both horizontally as well as vertically (see Figure 1). The horizontal growth occurs as the city expands. It can be affected by physical and economic conditions or human-made barriers that hinder the growth of the urban area (Conzen 1969). For example, Whitehand (1987) focuses on the economics of land use and its effects on the physical form of the urban landscape. The horizontal growth can also be divided into a sequence of phases, as new neighborhoods are added to it with a new leading type (Caniggia 1997). Within the Italian school, vertical growth is conceived as part of a never-ending process of transformation of existing buildings, progressively updated to new social and technical needs, leading to a dense and strongly layered architecture – the palimpsest of the cultural landscape of the city (Caniggia 1997; Caniggia and Maffei 2001).

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