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A Process for Defining Relations between Urban Integration and Residential Market Prices

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Abstract

The relationship between urban land value and accessibility has long been recognized. Location attractiveness can have a significant impact on growth of areas with increased accessibility, both in spatial and economic terms. Space Syntax is a well - known methodology of urban analysis, which uses computer techniques to analyze urban configuration. In order to study space as a primary unit of analysis, space syntax has developed different spatial metrics. The research presented herein focuses on one of the most widespread of those metrics, integration, and how this parameter is related to urban values. The existing literature in the field of urban morphology supports considerably one of the theory's principal premises; that spatial accessibility is correlated with economic land use values. Focusing on the residential property market, real estate market transactions should be considered as spatially related phenomena and thus spatial analysis procedures are needed so as to examine and obtain relations during the valuation process. The proposed methodological approach, attempts to investigate the relation between residential market prices and global integration syntactic metric in Xanthi, a medium - sized city in Northern Greece, by comparing continuous surfaces of both variables using a combination of Space Syntax theory and Geostatistical models, as well as Geographical Information Technology (GIS).

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1. Introduction and background

The relationship between urban land value and accessibility has long been recognized. Location attractiveness can have a significant impact on growth of areas with increased accessibility, in spatial and economic terms. Space Syntax is a well - known methodology of urban analysis, which uses computer techniques to analyze urban configuration. The origin of the method dates back to the '80s and relies on the work of Hillier and Hanson (1984); since then it has been further developed at the Space Syntax Laboratory of University College London, UK, and its various affiliates worldwide (Hillier, 2007). Major references in the field are the books by Hillier and Hanson (1984), Hillier (1996) and Hanson (1998), the proceedings of a series of biennial symposia, from 1997 onwards, and most recently, the Journal of Space Syntax, since 2010.

According to the Space Syntax theory, the total urban spaces' network, defined by the form of the natural urban tissue of every settlement or city, can be considered as a single and continuous spatial system. This system can be divided into segments, followed by the analysis as networks of choices and the representation using axial maps and graphs (Hillier and Hanson, 1984). Space syntax process involves the representation and quantification of attributes of the built environment and urban open spaces, under the objective of using them as independent variables for a statistical analysis of observed behavioural patterns such as routes and flows (Penn, 2003). In order to study space as a primary unit of analysis, space syntax has developed different spatial metrics.

The research presented herein focuses on one of the most widespread of those metrics, integration, and how this parameter is related to urban values. Integration is a syntactic measure that refers to the closeness of each segment of the network to all other segments; its value indicates the degree to which a line is more integrated with, or segregated from the system as a whole. In other words, it describes how easy it is to get to one segment from all other segments (Hillier and Iida, 2005, Charalampous and Mavridou, 2012). A high integration value of a line corresponds to high syntactic accessibility in the system. Integration is a global measure as long as its calculation is based on the total depth (Peponis et al., 2015). According to the Space Syntax glossary, the depth between two spaces is defined as the least number of syntactic steps in a graph that are necessary to reach one from the other (Klarqvist, 1993).

The theory of cities as movement economies is a milestone of the space syntax paradigm. The existing literature in the field of urban morphology supports considerably one of the theory's principal premises; that spatial accessibility is correlated with economic land use values (Liebst, 2015). Although a relatively recent research field, there is on-going growing interest on investigating the relationship between space syntax and urban economics, and more precisely between spatial configuration and residential and commercial property value (Law et al., 2013). Chiaradia et al. (2009) have reported a positive link between space syntax measures and rateable values using statistical models, focusing on London; locations with higher accessibility in connectivity graphs are mainly built up with higher value properties. Similar results are drawn by Desyllas (2004) for Berlin, whereas the main focus of this research was commercial office rents. Commercial office rent levels were also examined through an application in Stockholm (Enström and Netzell, 2007) in which it is indicated that spatial integration and choice, as measures of spatial centrality of the space syntax theory, are correlated to property values. Muldoon - Smith et al. (2015) combined GIS, space syntax and website analysis tools to examine the relationship between commercial real estate and spatial configuration in Leeds, UK. They found strong evidence that this relationship exists, although not uniform; it is more evident in and around the Central Business District (CBD) of the city. In a Cardiff case study, the examined spatial variables were measures of integration at different metric radii, choice, and segment length in association with different residential property types (Narvaez et al., 2012).

Focusing on the residential property market and in light of the discussion above, real estate market transactions should be considered as spatially related phenomena and thus spatial analysis procedures are needed so as to examine and obtain relations during the valuation process. Real estate market prices can be obtained through a variety of methods (Pagourtzi et al., 2003). However, Comparative Market Analysis (also known as sales comparison approach or market data approach) is considered the predominant approach among both real estate brokers and appraisers. The method aims at supporting market value estimations through comparisons with prices