

A study on transformation of urban layout patterns through analysis of spatial relationships with urban street configurations

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Spatial structures of large cities are typically complex and dynamic as a result of constant changes to their physical and socioeconomic characteristics. Studying both spatial and temporal forms is important for understanding their structures, as well as forecasting possible future changes in city growth patterns. In this study, we analyze structural changes of Seoul, the capital city of Korea, using physical and socioeconomic factors such as street structure, land use and population. We used 25 administrative sub-regions that have composed Seoul City for 30 years from the 1960s to the 1990s, with the analysis broken down into 10-year increments. We used the space syntax theory for the analysis of the changing structure of Seoul's street pattern in smaller resolution than existing methods that have focused on issues of accessibility based on zone levels. First, we analyze the attribute values of space syntax, population density and land uses changed in each administrative area of Seoul in each time period. Next, we examine the relationship between street networks and spatial patterns and evaluate whether development patterns are positive or not. Finally, we present the differences of spatial structures between planned areas and naturally grown areas.

Keywords: urban spatial structure; street structure; time-series analysis; space syntax model

Introduction

In urban planning, regional conditions and features need to be considered in order to improve the quality of living for residents and to create a sustainable urban environment. Spatial planning constitutes a basic and essential part of urban planning. The spatial structure of a city consists of physical elements and social elements; it also represents a dynamic system that continually transforms and evolves. Analysis of urban spatial structures is important in establishing urban planning.

In this dynamic system, land use planning is usually established first, followed by infrastructure at the street structure level. This leads to industrial development and becomes a main attraction for migration. When industries begin to decline, people move out, creating a cycle. In spatial planning, hierarchy of space depends on the street structure; it is closely connected to land use and subsequently affects population structure. A community should be formed in such a way that does not

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