

WHAT DETERMINES MIXED LAND USE? ANALYSIS OF BIG DATA ON COMMERCIAL DISTRICTS IN SEOUL, SOUTH KOREA

Abstract ID: 806

Individual Paper Submission

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Each commercial district has a different degree of mixed land use. Some commercial areas are a huge cluster with monotonous retail use, while others consist of a wide variety of land uses including residential or office uses as well. The specialization or diversity strategies are both to maintain the vitality of the region by utilizing localization economies and urbanization economies, respectively. Locational factors such as proximity to other amenities such as transit and public services have a great influence on land use mix (LUM). TOD around the railway station leads to mixed land use in the area due to efficient transit (Chen et al., 2016). Also, retail and food establishments demonstrate a certain location pattern in the urban area, making the neighborhood more diverse (Sevtsuk, 2014). A certain age or sex group of customers may also affect LUM in a commercial area due to their love of variety. Some young adults and the elderly prefer homes close to various urban amenities, and thus they tend to be attracted to a higher mix of land use (Blumenberg et al., 2019).

This paper aims to find the causes of differences in LUM in terms of the location and socioeconomic environments of commercial districts and the demographic characteristics of visitors and residents. To this end, we introduce a micro-scale approach where LUM is defined by the entropy index using data for more than 100,000 individual buildings and the demographics of visitors are examined based on a real-time big data, Seoul Living Population (De Facto population) data, as in research of individual travel patterns using smart card data (Menley et al. 2018). The existing studies on the relationship between land use and human activity usually use data collected at a specific time by a survey or the aggregation of existing data. The fixidity of the time dimension of data makes it difficult to examine the dynamic changes of visitors to commercial areas. The real-time big data on visitors enable us to overcome this limitation. By processing mobile phone GPS data, from January 1, 2018 to December 31, 2019, we analyzed the distribution of visitors in the city of Seoul and their visiting patterns in commercial districts along the time dimension. We use the number of visitors in the peak hour of each commercial district, their age and sex as explanatory variables in addition to the locational and socioeconomic factors of the district.

The expected results of the analysis are as follows: First, the total number of visitors increases the variety of LUM in a commercial district, as preferences become varied with the number of customers. Second, the LUM is relatively high in the commercial areas where the proportion of young adult (20-30s) visitors and residents is higher than those in other age groups. Lastly, higher accessibility to transit increases the variety of LUM by reducing the need for parking space. These results may help planners design and regulate land use for commercial areas in terms of LUM in an appropriate way.

Citations

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Key Words: mixed land use, urban commercial clusters, transit accessibility, big data, applied GIS