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The effect of multiple urban network structures on retail patterns – A case study in Taipei, Taiwan

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ABSTRACT

During the economic restructuring that has transformed rising Asian cities over the past half-century, retail activities have contributed gradually to urban economic growth. Previous research reveals that retail patterns have been affected not only by zoning regulations but also by urban network structures, which are often conceptualized in an overly simplified manner. As a result, this study proposes a retail spatial integrated model (RSIM) that focuses on the relationship between retail patterns and urban network structures and makes comparisons between the effectiveness of these network structures using a case study in Taipei, Taiwan. In generating the RSIM, this study uses space syntax methodology to analyze multiple network structures, including the street configuration, bus network and metro network. According to the results of this study, the RSIM has a better explanatory capacity than a general model that contains a single network structure. Overall, this study finds that both street configuration and public transportation networks influence retail patterns.

Introduction

In cities in developing Asian nations, the retail sector has become one of the most dynamic sectors supporting urban growth in recent decades. As the amount of labor in this sector has continually increased, retail development has contributed considerably to the economic restructuring of cities (Vias, 2004) and has come to be recognized as a tool for increasing central business district (CBD) development or urban core growth (Lowe, 2005; J Lopes Balsas, 2000). In recent years, to address the impact of globalization and promote urban growth, local authorities have also conducted retail restructuring (Thomas & Bromley, 2003; Whitehead, Simmonds, & Preston, 2006). Accordingly, there has been a dramatic increase in the amount of research that explores the factors affecting retail spatial development for the purpose of informing public policy decisions. The current literature indicates a recent shift toward a specific focus on the factors that affect retail patterns. According to past retail location theories, market size, which depends on the "demand" of consumers in a specific area, appears to be the most important factor in retail patterns. However, in addition to market size, spatial planning strategies implemented by governments have gradually become a significant driving force affecting the spatial activities of planned cities.

Zoning regulations and improvements in transportation are identified as common spatial planning strategies that can control retail patterns by shaping land use within urban areas. Zoning regulations have a direct impact on land-use patterns, whereas improvements in transportation affect land-use patterns by regulating the accessibility of locations (Lin, Feng, & Hu, 2006; Zhu & Liu, 2004). Several studies have verified that zoning regulations have significant effects on urban development; Wu and Cho (2007) demonstrated the influence of land-use regulations on land valuations in five western states in the United States, and Mayera and Somervilleb (2000) recognized that land-use regulations had a significant impact on new residential construction.

In studying transportation improvements, various researchers have investigated the relationship between urban transportation networks and retail patterns (Castillo-Manzano & López-Valpuesta, 2009; Song & Sohn, 2007). Urban transportation networks, by definition, combine several urban network structures including street configurations, bus networks and metro networks. Many studies have measured the accessibility of street configurations, showing the effects of urban network structures on retail patterns (Benoit & Clarke, 1997; Clarke, Eyre, & Guy, 2002; Murad, 2003; Ritsema van Eck & de Jong, 1999). More recently, several studies have verified the effects of public transportation networks on urban activities. Cervero and Kang (2011) conducted a case study in Seoul, Korea and concluded that locating bus stops within impact zones might attract retailers to specific sites and change the urban land-use style. Castillo-Manzano and López-Valpuesta (2009) noted that the distribution of neighborhood retail shops was related to the location of subway stations in Spanish cities. Lin

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et al. (2006) found that the construction of a metro system in Taipei could lead to the redistribution of urban activities. Based on this research, it seems that street configurations as well as public transportation networks can have a substantial impact on retail patterns. However, most of these studies only consider the relationship of between one specific urban network structure and retail patterns. In reality, each urban transportation network is used by different travelers and constitutes a separate structure with a separate effect on spatial activities within the city. However, there is a notable lack of research that addresses the effects of multiple network structures on retail patterns.

The aim of this paper is to develop a retail spatial integrated model (RSIM) that reflects the connections between retail patterns and multiple urban network structures using the case study of Taipei, Taiwan. The model includes three types of urban network structures along with other variables such as zoning regulations and market size. The paper is organized as follows: the next section introduces the measurement procedure for the urban network structures; A case study: Taipei, Taiwan introduces the case study; Material and methods describes the research design; Results and discussion outlines the results and discussion; and the final section summarizes the findings and future research directions.

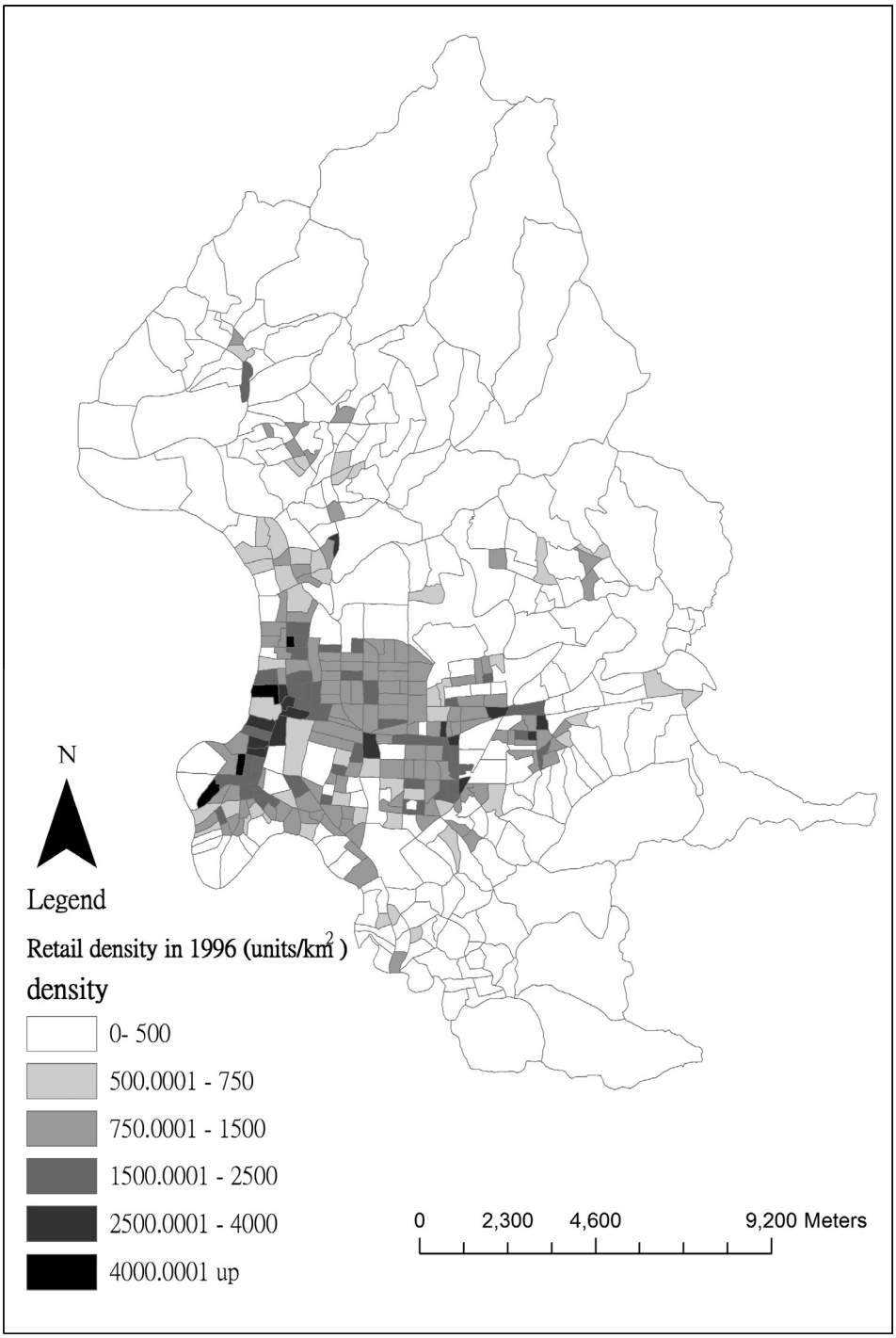

Fig. 1. The retail patterns in Taipei City in 1996.