STUDY ON RELATIONSHIP BETWEEN CATCHMENT AND BUILT ENVIRONMENT OF METRO STATIONS IN HONG KONG AND SHENZHEN

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Abstract

After many years’ of rapid development, many cities in China are suffering from several postindustrial urban issues, such as crisis of energy and air pollution. To advocate more use of public transport is certainly one of the effective approaches to help make urban development more sustainable. To this end, constructing metro systems integrated with land use is continually made use of and discussed worldwide; specifically, many researches started to focus on the cases in North America at the end of twentieth century. With the typical urban image of high rise and high density city, MTR of Hong Kong became one of the most successful metro systems of the world. To date, nearly 50% Hong Kong people dwell within 500 meters of a MTR station, more than 30% daily travel by the metro system which is less than 180km of total route length, only half the length of Beijing. With ‘rail plus property’ (R+P) mode, MTR became one of a kind urban rail system that operated without any further subsidy from government.

This dissertation focuses on the issues of how built environmental (BE) factors impact on catchment area of metro stations, and surveyed 74 stations in Hong Kong and cases in Shenzhen, two cities, which are managed under different policies, although huge population has shaped similar high density land use pattern with same climate situation. Through quantitative analysis on the relationship between patronage and BE factors that have been suggested by early research, some significant parameters have been specified referring to building forms and spatial structures of catchment areas. Accumulating pattern of most of BE factors has been found within station catchment areas in Hong Kong; therefore, correlative relation has been characterized and thus, we found, that a station’s centralized compactness of urban spatial structure accelerates the riding intent of metro. The findings of case study in Hong Kong have been validated through comparative study of Shenzhen.

Based on quantized datasets of stations and census materials in Hong Kong, quantitative approaches of space syntax and geography information system (GIS) have been employed on the analysis of urban configuration and spatial structure. All
cases have been investigated together and examined in groups, classified by features of location, density, and patronage rate of station, through which the effect of BE dimensions can be evaluated among stations with similar spatial features.

Most of related studies have focused on inspiration on high patronage through economic or land use viewpoints. Based on general survey on BE factors related to ridership, this dissertation extends exploration to the gap of issues between urban spatial structure and riding intent, through comprehensive evaluations on urban configuration and inhabitants’ activities. These evaluations reveal that powerful station catchment relates to compactness of urban structure, wherein accumulation of activities and agglomeration of urban functions may provide highly efficient travel for inhabitants. Finally, the features of compact pattern centralized by metro catchment have been characterized in three levels, such as (a) station building form, (b) station accessibility, and (c) accumulation of daily activities in the area. Then, in conclusion, through the comparative study between cases in Hong Kong and Shenzhen, the key lessons were drawn at the different constructing stages of the metro system.
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