



Empirical Study on the Driving Force of Urban Utility Tunnel Development

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Abstract

Urban utility tunnel has been regarded as an important symbol of urban modernization, so it is important to understand the quantized relationship between city development and urban utility tunnel for city management and policy making. In this study, the internal relationship between the development amount of urban utility tunnel and urban population density was discussed, as well as urban GDP per capita, urban construction land area per capita and urban land price index, based on the IBM SPSS platform, through adopting the development amount of urban utility tunnel and the urban development data of the past 46 years of Japan. It was shown that the correlation relationship of the development amount of urban utility tunnel with the density of urban population was comparatively strong negative, and relatively strong positive, comparatively strong positive, relatively strong negative for GDP per capita, urban construction land area per capita and urban land price index respectively, which explained the driving effect that urban development imposed on urban utility tunnel construction in essence. Furthermore, a quantitative model was proposed for the relationship between the development amount of urban utility tunnel and urban development indexes, and the model could be a reference for decision making of urban utility tunnel development in China and other countries.

Keywords: Urban Utility Tunnel; Influential Factors; Correlation Research; Regression Research.

1. Introduction

Throughout the centuries, urban utility tunnel has been regarded as an important symbol of urban modernization, and also be an inevitable product of city development, which has been proved by the development history and experience of developed countries [1-10]. Systematic research has been carried out with a variety of engineering practices [11-14]. It led to the establishment of reasonable design, planning, financing and standard systems which has been worked out successfully in the mass construction of their own countries [11-15]. Behind the blossoming phenomenon, it is necessary for city management officials and practitioners related to better understand the relationship between city development and urban utility tunnel in a correct and rational way.

Japan perhaps owns the most advanced technology and the most complete scheme and laws for utility tunnels in the world. The first utility tunnel in Japan was built in 1926 in Chiyoda, Tokyo with power cable, telecom, water supply and gas pipelines incorporated. Urban utility tunnel construction in Japan had little further progress until the 1950-1960s. Then the Japanese government started to develop utility tunnels rapidly at the same time as its road construction program (see Figure 2) [16-18].

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