

Transportation and Urban Land-Use System for the Sustainability of Cities, a Case Study of Muscat

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Abstract : Cities are dynamic in nature and are characterized by concentration of people, infrastructure, services and markets, which offer opportunities for production and consumption. Often growth and development in urban areas is not systematic, and is directed by number of factors like natural growth, land prices, housing availability, job locations-the central business district (CBD's), transportation routes, distribution of resources, geographical boundaries, administrative policies, etc. One sided spatial and geographical development in cities leads to the unequal spatial distribution of population and jobs, resulting in high transportation activity. City development can be measured by the parameters such as urban size, urban form, urban shape, and urban structure. Urban Size is the city size and defined by the population of the city, and urban form is the location and size of the economic activity (CBD) over the geographical space. Urban shape is the geometrical shape of the city over which the distribution of population and economic activity occupied. And Urban Structure is the transport network within which the population and activity centers are connected by hierarchy of roads. Among the urban land-use systems transportation plays significant role and is one of the largest energy consuming sector. Transportation interaction among the land uses is measured in Passenger-Km and mean trip length, and is often used as a proxy for measurement of energy consumption in transportation sector. Among the trips generated in cities, work trips constitute more than 70 percent. Work trips are originated from the place of residence and destination to the place of employment. To understand the role of urban parameters on transportation interaction, theoretical cities of different size and urban specifications are generated through building block exercise using a specially developed interactive C++ programme and land use transportation modeling is carried. The land-use transportation modeling exercise helps in understanding the role of urban parameters and also to classify the cities for their urban form, structure, and shape. Muscat the capital city of Oman underwent rapid urbanization over the last four decades is taken as a case study for its classification. Also, a pilot survey is carried to capture urban travel characteristics. Analysis of land-use transportation modeling with field data classified Muscat as a linear city with polycentric CBD. Conclusions are drawn suggestion are given for policy making for the sustainability of Muscat City.

Keywords : land-use transportation, transportation modeling urban form, urban structure, urban rule parameters

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