ABSTRACT

Mass transportation in metropolitan cities is facing many problems mainly during peak hours due to concentration of commuters on certain routes. The consequence of this phenomenon coupled with insufficient public transport and road infrastructure facilities and inadequate regulation are responsible for high level congestion of roads, low journey speeds, high energy consumption on transport and increased vehicular emissions.

In Chennai, the present modal split revealed that only 40 percent of the travel in the City is made by public transport as against a minimum of 70 percent recommended. Hence, there is an urgent need to study the land use-transport interaction along the suburban rail corridor to increase the patronage. The northern suburban railway line of Chennai Metropolitan Area (CMA) from Chennai Central to Gummidipoondi has been taken for study. There has seen significant industrial and residential growth on the northern corridor. The public transport presently existing in these areas are suburban railways and Metropolitan Transport Corporation buses. An opinion survey has been conducted to know the opinion of the train passengers to collect information with regard to mode used and distance traveled, etc.

A household survey has been carried out within the influence areas of suburban stations to determine the validity of the influence areas delineated. Hence, in this study an attempt is made to find the trend of land use disposition in various periods, namely 1986, 1996 and 2006. Land use
map has been prepared by digital image processing methods using ERDAS Imagine 8.7 software. The land use data used are remote sensing and satellite data such as panchromatic aerial photograph, IRS1D, IRS P6 LISS III Digital data.

The land use analysis revealed that study area in Chennai City is constrained due to existing density patterns. Since the area is densely developed, it offers limited scope for further densification. Whereas in CMA segment, there is much scope for accelerated development as density is relatively lesser.

The study also attempted to find out the optimal patronage of passengers to train service by identifying dynamic variables influencing the developments. As the assessment of patronage along the corridor involves a large number of complex and dynamic variables a dynamic simulation modelling approach using a STELLA 8.1.4 software is used to develop the model and test the same for various policy options. The model consists of mainly three sectors, namely population, land use and transport. Each sector will have its own model components, which are interrelated to various sectors in a way that the results of one sector would go as an input to the other sectors.

The System Dynamics model developed for northern suburban rail corridor in Chennai is tested for three policy options. The model reveals that the simulation III of maximum densification is the best policy option. The rail transit share in simulation III is 8.12 times more than Simulation I in CMA
segment, by increasing the FSI and augmenting the rail transit operations through maximum improvement policy options. Thus, the simulation results of the present study established that there is an imperative need to identify the most probable dynamic changes expected during a foreseeable future. Application of this model to similar urban area with moderate modifications will prove to be valid. Further, the model can also be extended to micro level planning on a zonal basis.