

ABSTRACT

Transportation planning is necessary for an orderly development of any urban area. This should involve both people and goods. So far, it has concentrated almost exclusively on the former. Considerable research has been carried out on the movement of people within urban areas and its impact on urban development. But the problems of urban goods movement have attracted comparatively little attention.

The urban centres are the hub of commercial activities. In India the urban core continues to have the business centres where commodities are brought in bulk, stored and distributed within the urban area. Being the oldest part of the urban development, the increased pressure of the urban growth over these congested areas has resulted in acute problems like traffic impedance, pavement damage, increased traffic accidents, environmental pollution and above all increase in the cost of commodities due to delay.

The solutions that are formulated for these problems in the Indian urban areas are framed out of a general understanding of the urban goods movement. They grossly lack an insight into *various cost attributes* and other *intangible* or *abstract location attributes* that are associated with this complex mechanism. And hence such programs are adhoc in nature and their results are discouraging or unfavourable.

Although a large body of theoretical and empirical work exists in the field of *Location Analysis* related to manufacturing industries and their ancillary facilities like warehousing, comparatively little has been reported from the field of goods distribution activities especially when it comes to the level of human settlements like urban areas.

The methodology developed by this research integrates various costs associated with transporting commodities with the relevant location attributes. In addition to the cost of transportation, that is generally considered, the methodology takes into account the tangible external cost (community cost) and intangible external costs related to urban goods movement. Seven location criteria that are relevant in siting and development of truck terminal locations are also incorporated in the methodology. The methodology is based on the principle of integrating (i) ranking of terminal

combinations on the basis of total cost involved in moving goods in urban area and (ii) ranking the same combinations on the basis of their intangible location attributes, to obtain the final ranking of terminal combinations.

The methodology uses a *cost minimization function* in ranking the terminal combination in terms of cost. *Analytic Hierarchy Process* is employed in ranking the terminal combinations in terms of their abstract location attributes. The integration of these rankings is achieved using the method of Integrated Rank Index where the individual *ranks are relatively weighed*. The methodology also gives the allocation of goods to the respective terminals. The in-built routing of goods in the methodology helps to identify least congested road links and the links serving less risk prone areas in terms of environmental pollution.

Chennai, a mega Indian city and **Calicut**, a small city are selected for the application of the methodology. In addition to the existing central location of wholesale business, probable locations are selected at the peripheral areas of the two cities.

The sensitivity analysis is carried out to study the effect of various parameters on the selection of the terminal locations. The relative weights assigned to the two components – component of cost attributes and that of abstract location attributes – are also altered to see the probable change in the solution set.

KEY WORDS: Urban goods movement, Traffic impedance, Cost attributes, Abstract location attributes, Location analysis, Tangible external cost, Intangible external cost, Truck terminal, Ranking of terminal combinations, Analytic Hierarchy Process, Integrated Rank Index, Allocation of goods.