

# A Review Paper on Land Utilization and Transport Interaction

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**Abstract:** *The road networks in many countries are not well designed which leads to many traffic problems, mainly traffic congestion. In order to avoid such traffic problems and have a smooth traffic flow properly designed networks should be adapted for both public and private vehicles for an ideal modal share between them. The network design problem is one of the most significant problems faced by traffic management official. This transportation problem belongs to the class of difficult combinatorial optimization problem, whose optimal solution cannot be found by available analytical method, but swarm intelligence could provide feasible solution. The swarm algorithm is a stochastic, random-search technique that belongs to multi-agent algorithms. Swarm intelligence, inspired by behavior of insects, is a name given to a new set of nature-inspired computing paradigms which are being successfully applied to optimization problems in a variety of field. Social insect colonics show that very simple organisms can form system capable of performing high complex tasks by dynamically interacting with each other. Swarm intelligence (SI) can be used to model complex traffic and transportation processes, which can be successfully analyzed by analytical models. The concept of agent-based modeling is applied to problems of complex behavioral pattern; this approach based on the idea that a system is composed of discrete individuals and each individual interacts with others according to localized knowledge and with the aggregation of the individual interactions, the overall image of the system emerges. The primary goal of this paper is to acquaint readers with the basic principles of Swarm Intelligence and its uses in network design problems of transportation. The paper also presents a various branches of Swarm Intelligence.*

**Keywords:** Land Utilisation and Transport Interaction (LUTI)

## 1. Introduction

### General

Number of traffic accidents and many are the raising of modal share of public transit in the cities one of the major activities to be performed by traffic planners and the city authorities in order to reduce traffic congestion. This could be done by proper design of public transit networks, expansion of existing lines, increasing the availability of direct service among various origin-destination pairs, frequencies increase, development of the bus system separated from the rest of the traffic network improving passenger's etc. the bus network shape and frequencies, highly depend on passenger demand, number and size of available buses, and budgets available.

In developing countries like ours available budgets is a major constraint due to weak economic conditions. This transportation problem belongs to the class of difficult combinatorial optimization problem, whose optimal solution cannot be found by available analytical method, but proper system of LUTI (Land Utilization and Transportation Urban road network in many countries are extremely congested Many of the factors that should be taken into account when designing bus network are mutually in conflict, that is why this problem belongs to the class of difficult optimization problems.

For examples, for shorter waiting times of passengers, higher number of buses will be needed so that frequency is higher, etc. due to the conflicting nature if these interests, we treat the bus network design problem as a multi-criteria decision making problem.

We try to maximize the number of satisfied passengers and to minimize the total travel time of all served passengers.

## 2. Statement of Problem

Public transport is the predominant mode of motorized local travel in cities. This is predominantly by road, since commuter rail services are available only in the seven metropolitan cities of Mumbai, Delhi, Chennai, Kolkata, Bengaluru, Hyderabad and Pune, while dedicated city bus services are known to operate in at least 25 cities with a population of over one million. Intermediate public transport modes like tempos and cycle rickshaws assume importance in medium size cities. However, the share of buses is negligible in most Indian cities as compared to personalized vehicles, and two-wheelers and cars account for more than 80 percent of the vehicle population in most large cities.

Generally, traffic in most of the cities in India moves slowly, where traffic jams and accidents are very common India has very poor records on road safely around 90,000 people die from road accidents every year. At least 13 people die every hour in road accidents in the country; also in the year 2007 road accidents claimed more than 130,000 lives, overtaking China.

## 3. Objectives

The survey was a survey of individual travel behavior. This survey collect information about an individual (socio-economic, demographic, etc.), their household, and a diary of their journeys on a typical normal day (their start and end location, start and end time, mode of travel, accompaniment and purpose of travel). Also to get the exact idea about the number of peoples using the public

vehicles in daily basis and the number of peoples who does not use public transport, also to Analyze the reasons and the issues behind it.

The objectives of the research:

- 1) To identify the main problems of sustainable service and facility management in Public Transportation System.
- 2) To analyze the Traffic situation and scope of the improvement.
- 3) To present a well prepared plan to be adopted for resolving current traffic problem by increasing the use of Public Transportation System.

#### 4. Policies and Strategies

A draft National Road Traffic Safety Plan (RTSP) was prepared by the Inter-Ministerial Road Safety Forum for the period of the 11th Five-Year Plan (2006 – 2010). A summary plan<sup>21</sup> based on this draft has been adopted by the State Council and is currently under implementation. This Plan can be viewed as a significant effort to place emphasis on achieving targets. As a result, clear targets have been set for a reduction in the number of road traffic fatalities. This can be summarized as follows:

1. During the period of the 11th Five-Year Plan (2006 – 2010), the annual number of road traffic fatalities<sup>22</sup> is required to be less than the average annual number that occurred during the period of the 10th Five-Year Plan (i.e. 105,100).
2. In 2010, the annual number of road traffic fatalities has to be less than 90,000, while the road traffic fatality rate (deaths per 10,000 vehicles) is to be less than 5, and the number of accidents involving the deaths of more than 10 people is to be less than 37.

#### 5. Methodology

##### General

To solve all the traffic related problems in India the sample survey of a particular area and from the overall survey and the project work now the team got the exact idea about the main and sub issues related to the transportation system in surveyed area and hence tried to solve and suggest the remedial measures over these problems, below are the suggestions given to the civilians and the Municipal Corporation of Pune city.

##### Methodology

- The very prior step of this project work is to prepare the sheet and to decide the questions to be asked to the civilians,
- The next and very important step of the project is to decide the area to be surveyed,
- After that the household sample survey is to be done by the team members,

- After the survey data is collected the next step is to study the data collected by the survey,
- After analyzing the data it is necessary to suggest the solutions to every problem of the civilians related to transportation,
- Some new concepts which are not implemented yet are to be used as the implementation in the surveyed area.

#### Summary

In this chapter Methodology the author has been stated the stepwise procedure of the project work done by the author and team.

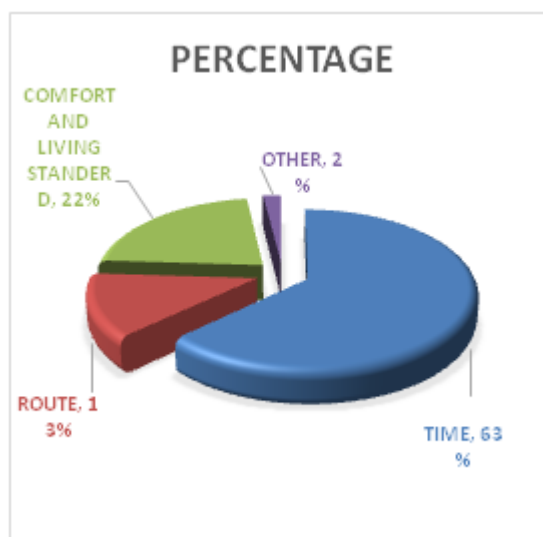
#### 6. Results of Research in Graphical Review

From the 850 household people opinion on using of public transportation system for their daily purposes or work is

**Table 4.2:** Percentage of opinion

Opinion	
Yes	No
25.42%	74.58%

The peoples saying NO were having the various issues of which following are the issues we found:



#### 7. Conclusion

- Problems Faced Related to Transportation in Surveyed Area:
  - The collection of data, Survey, and other work is done and the analysis of the collected data also has been done, the existing planning of the surveyed city is partially developed and that unplanned or undeveloped part of the city is having more traffic related problems such as Traffic Jams and hence these areas are facing more air pollution, noise pollution and the Traffic Jams developed in those areas is creating the problems to the people staying in the developed areas. While doing the survey we found various traffic issues faced by the peoples staying in the planned area while using the public transportation such as: Time

issue, Comfort or inconvenience issues, Living standards, Unviability of Routes. The main problem of the people staying in the unplanned area is: Less punctual transportation, Smaller Roads causing Traffic jams, High Noise pollution, Increase in Air pollution, Uneconomical and the major problems faced by the people staying in the previously planned city: Less punctual transport system, Less Comfortable, Doesn't match to the living standards, Uneconomical. To tackle above problems we suggested following aspects.

- Improvements in the Transportation Ministry System in Municipalities:
  - Providing more number of Buses and increasing the circulation of buses by providing more routes at the morning and the evening period, on Sunday the number of Buses on the roads should be 30 percent only,
  - Enlarging the sizes of the roads and using more number of Traffic Signals.
  - Use of Lithium Buses to reduce air pollution,
  - Improve the standards of the Buses and the comfort level of Buses,
- Improvements in the Public Behavior:
  - One family should have maximum 1 two wheeler and 1 four wheeler, four wheeler should be used only at the time of emergency and Sunday only,
  - People must use the public transportation system as far as possible, reducing the use of private vehicles,
  - Hence from the above introduced results and the analysis of the survey it should be concluded that, in order to save the fuel consumption, pollution, traffic jams, time delay, reduce air pollution, reduce noise pollution and to develop the city the above project concept is totally feasible

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