FORECASTING OF PASSENGERS DEMAND
- A CASE STUDY

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ABSTRACT

Public Transportation is termed as providing regular and continuous conveyance to the people in the society. The primary mode of transportation in India is road. Nearly 80% of the people in India are depend on road ways. The State Government is the primary stakeholder in road Transportation Corporation. The fundamental objective of any RTC is to provide high quality service at economical rates. But most of RTC’s are collecting high fares and providing low quality service. In India 72 million people are travelling in road ways for their day today life. Even though there is a large scope of profits because of the demand, most of the state RTC’s are in losses. The losses are mainly because of unscientific resource allocation and huge investment.

Forecasting of passengers demand should be the first step before investment and operations planning. Forecasting of passengers travelling in road ways is nearly accurate, then the resources can be allocated properly. Hence we can save the wastage of resources like crews, inventories, investment etc. Here we made an attempt to forecast the passengers travelling in road ways from Madanapalle, which is located in Chittoor district in Andhra Pradesh. Route factor, time factor, day factor are consider as independent variables and demand of passengers from Madanapalle is taken as dependent variable. A linear multiple regression analysis (LMRA) model in SPSS and results and conclusions are made.

Key words: Resource, Transportation, Forecast, Investment, Operations
1. INTRODUCTION

With the enormous exponential growth of population in India, people have to depend on public transportation system for the day to day life. State Government is the primary stake holders in a state Road Transportation Corporation in all the states of India has to provide quality service at best price. Improper operations planning (mainly scheduling the facilities) is the main reason for losses in SRTC (State Road Transportation Corporation) issues and challenging related to dynamic resources allocation policies in road transport sectors. The primary objective of any SRTC is providing high quality service with economical rates by scheduling adequate buses and crews. Forecasting demand of passengers is the fundamental step in scheduling. But because of the fixed schedules in each depot, the resources are not changing dynamically, which results heavy losses to the SRTC’s. To reach the primary objective of SRTC’s the resources should be allocated dynamically from time to time yields good service and low operating cost. A case study is done in Madanapalle, which is located in Chittoor district of Andhra Pradesh to forecast the demand of passengers from Madanapalle to different places in five major routes. Thirty days passengers data is collected with three different independent variables like route factor, day factor and time factor. SPSS software is used for analyzing the collected data with linear multiple regression analysis and output s analyzed.

2. LITERATURE REVIEW

G. Sadasiva Prasad etal [1], issues And Challenges Related To Dynamic Resource Allocation Policies In Road Transport Sectors”, He suggested the various steps to be taken for improving the efficiency of functioning in road transport sector and suggest methods for the same. G. Sadasiva Prasad etal [2], did extensive work on maximizing the effective use of transport facilities using dynamic resource allocation. Luis David Galicia etal [3], conducted experiments on methodology for bus rapid transit ridership estimation and developed phase implementation method for transit estimation. Vuchic vukan R etal [4], conducted experiments on urban transit-operations in relation to their planning and economics and came out with a set of conclusions, which very well matched with the real time values. Levinson, Herbert, etal [5], reported on TCRP report 90, Bus rapid transit systems. Kittelson & associates, etal [6], did extensive work on transit capacity and quality of service in transport sector and suggested that a well developed scientific approach will yield satisfactory results. Sterman John D etal [7], worked on a new concept of business dynamics-system thinking and developed models for complex real time real world problems. Wang etal [8], identify the importance of urban transport system and developed the system dynamics model of urban transportation system and their application.

3. SCOPE AND OBJECTIVES OF PRESENT WORK

The fundamental objective of any RTC is to provide high quality service at economical rates. But most of RTC’s are collecting high fares and providing low quality service. In India 72 million people are travelling in road ways for their day
today life. Even though there is a large scope of profits because of the demand, most of the state RTC’s are in losses. The losses are mainly because of unscientific resource allocation and huge investment. Hence the scope of the present work is to improve the method of resource allocation leading to a high quality service at economical rates.

4. ISSUES AND CHALLENGES INVOLVED IN THE PRESENT WORK

1. Correct estimation of the demand for the vehicles is very important and is a challenging job in dynamic resource allocation of transport facilities.
2. Forecasting of passengers demand should be the first step before investment and operations planning.
3. With the enormous exponential growth of population in India, people have to depend on public transportation system for the day to day life. Hence a correct estimation of demand for the vehicles is very important.

5. METHODOLOGY

The methodology of present work consists of the following steps.

To make the present analysis more meaning full a typical case of demand for transport for the passengers in madanapalle (AP, S.India) to different routes is considered and analyzed as detailed below.

1. Consider an appropriate linear Regression analysis model.
   \[ \text{Model } Y=B_0+B_1X_1+B_2X_2+B_3X_3+E \]
2. Fixing the dependent and independent variables.
3. Collecting data related to passengers demand in Madanapalle to different routes.
4. Collecting data related to passengers demand in Madanapalle to different routes with timings.
5. Collecting data related to passengers demand in Madanapalle to different routes with timings and a day factor (working day / holiday).
6. SPSS is used to analyze the data in Linear Multiple Regression Analysis and running the programme for output.
7. Mean and standard deviation of independent variables are analyzed.
8. Correlations between passengers demand and route factor, day factor, time factor are interpreted.

6. ASSUMPTIONS

1. Demand of passengers is a dependent variable denoted with letter Y.
2. Route factor (X_1) day factor (X_2), time factor (X3) are considered as independent variables.
3. Consider response Y and predictors X_1, X_2, X_3
4. Relationships among the predictors are not considered.
5. Deviations are measured in Y direction only.
6. Mean of Y is liner function of X_1, X_2 and X_3
7. Square of errors are minimum.
7. RESULTS AND DISCUSSIONS
After running the programme in SPSS, we got the above output and the following results and conclusions were made.

1. \( Y = -274 + 1050.69X_1 + 206.38X_2 + 435.79X_3 + E \).
2. Route factor \( (X_1) \) is heavily influencing the demand of passengers because correlation between route factor \( (X_1) \) and demand of passengers \( (Y) \) is 0.758.
3. Day factor \( (X_2) \) influence on demand of passengers is low because correlation between day factor and passengers demand is 0.157.
4. Time factor \( (X_3) \) influence on demand of passengers \( (Y) \) is moderate because correlation between time factor and passengers demand is 0.315.
5. Explained variation is 0.699 i.e. all the three factors have 69.9% influence on demand of passengers.

8. CONCLUSIONS
1. Route factor heavily influences the demand of passengers.
2. Day factor influences demand of passengers and is low.
3. Time factor influences demand of passengers.

REFERENCE