Chapter - I

Introduction and Design of the Study
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INTRODUCTION AND DESIGN OF THE STUDY

INTRODUCTION
A well-knit transport system is important for all-round and sound development of an economy. It combines different components and different sectors of the economy and affects the economy at all points of development. It is the basic ground on which the economic development is erected. A well developed transport system has become a symbol of civilization. So the growth accomplished in the field of transport is used as one of the parameters to measure the economic development of a country.

At present the transport system consists of roads, railways, airways and waterways. Among these modes of transport, road transport occupies the prime position because even for using other modes of transport, road transport is essential and it is the basic infrastructure for the economic development of rural areas. It is the only means of access to interior rural areas, which are not linked by any other means of transport.

By connecting the remote villages with the commercial towns and cities, the road transport facilitates the mobilisation of all the available resources within the economy and accelerates the process and pace of industrial growth. According to K.B.Patel “Road Transport has a dynamic role in the strategy and economic development because of its built-in flexibility and adaptability to a variety of operating conditions and ability to extend its services to our vast rural
areas and its lakhs of villages”.\textsuperscript{1} It promotes a balanced growth of the various regions in the country and can help in the dispersal of industry and commerce over wider regions.

In a developing economy like India, road passenger transport deserves a high priority as it forms the backbone of a passenger mobility system and is the principal carrier of development process from one part of the country to another. Indian economy is an agricultural economy and nearly 40 per cent of the national income of India is contributed by agricultural sector.\textsuperscript{2} A majority of the people who live in rural areas is engaged in agricultural sector which requires movement of goods, raw materials and people to the nearby cities or towns. The economical means of transport available for them is bus transport. Thus bus transport plays an important role in the mobility system of people in rural areas.

Initially the road passenger transport services have been dominated by the private operators. Most private operators did not have effective finances to run the services in a smooth manner. Their operations were not systematic and they tend to neglect non-profitable rural routes.

In order to remove the shortcomings of private operations and to satisfy the growing demand of the public for comfortable short distance travel, Government contemplated running passenger bus services by itself. The Government of India immediately after independence, decided to nationalise road transport services in the various states and brought on the statute book: “The Road Transport Corporation Act, 1950” facilitating creation of State Road
Transport Corporations (SRTCs) by the various State Governments. In India, State Transport Undertakings take pride in elucidating their corporate objective as “wherever there is a village, there must be a road, and wherever there is a road, there must be a bus”.³

Now road passenger services are being provided both by Govt as well as private sectors in the country. The SRTUs have to manage their services in stiff competition with private operators. Transport is a service-oriented industry where the passenger is in focus and passenger service is the differentiating factor. The success of a service organisation depends on the effectiveness and efficiency of the service rendered to the public. Passenger satisfaction is the key to secure passenger reputation and it generates superior long-term performance. Now every passenger knows what he can expect from the transport system. They demand quick mobility at minimum cost with maximum satisfaction.

STATEMENT OF THE PROBLEM

In developing economies including India, non-availability of basic amenities viz., education, health and medicare, drinking water, agricultural marketing, job opportunities, communication and transport facilities is common to the rural population living in villages. Improved road and efficient rural transportation facilities not only enable the increase of mobility but also reduce the migration of people from villages to towns thereby fulfilling their social and economic needs through efficient transport. Rural background of Indian economy requires road passenger transport for movement of men and material
from rural to urban and vice versa. The people who live in villages entirely depend on the passenger transport services for their mobility.

Since independence, the Government of India has launched many developmental programmes to increase the standard of transport systems. Three, 20-year Road Development Programmes were introduced to develop the road infrastructure. The Government adopted this measure mainly to develop the rural roads. The Rural Transport Planning has launched Intermediate Modes of Transport (IMT) through Integrated Rural Development Programme (IRDP) and other developmental programmes to improve the rural transportation.\(^4\)

The Committee on Transport Policy and Co-ordination (1966) strongly recommended the development of rural roads and improvement of road communication in the economically backward areas.\(^5\) State Transport Undertakings (STUs) which are created under State Road Transport Corporation Act 1950 (SRTCs) also play a vital role in the overall development of the country in general and development of rural area in particular. Here it is apt to quote that, “the rural STUs achieved a bus utilization of 311.7km. per bus held and fleet utilization of 92.7 per cent during the year 2000-2001”.\(^6\)

Despite the implementation of transport developmental programmes, passengers are not fully content with the transport services and passenger dissatisfaction persists. Passengers expect accident-free, break-down-free, punctual service with no service cancellation and a cordial approach by crew. Further, a spate of complaints regarding the inadequacy of transport facility, quality of
service, poor condition of bus, undue waiting periods at bus stops, worst condition of road, etc., are voiced by the passengers through editorial and complaint columns in newspapers and magazines.

Further, the problems of rural passengers are different from the urban passengers. In urban areas, the frequency of bus service is high. The number of routes covering particular stages will also be relatively more. For example almost all city buses touch the Central Bus Stand, the main bazaar and the railway station. But not all buses would touch a particular village. The road facilities are poor in rural areas compared to urban areas. While the new and better-maintained buses go round the cities, the old and the poorly maintained buses are inducted to serve the rural areas. Due to such problems, the crew find it difficult to maintain punctuality and show courtesy to the passengers. Some times operating rural trips would be uneconomical and even loss making. So several routes in rural areas have to be operated only as a social service as such routes are economically unviable and loss incurring.

The need to evaluate the rural passenger satisfaction and get their problems enlightened is felt by the researcher and hence the present study has been undertaken. The following questions emanate from the problem:

1. Are the passengers satisfied with the existing services and facilities provided by the rural transport of SRTCs? If so, what is the extent of satisfaction?
2. What are the factors that influence passenger satisfaction?
3. What types of problems do the passengers of rural bus services face?
4. How could these problems be solved?

5. To what extent passenger satisfaction varies between public and private transport systems?

REVIEW OF THE PREVIOUS STUDIES

A review of the following studies conducted by various researchers in the area of operational efficiency of the transport services in rural areas, operators' problems, passengers' transport needs, passengers' perception, travel and mode choice behaviour, passengers' satisfaction, passengers' problems, etc., has motivated and enabled the researcher to formulate the present study.

It has been stated in the report of The Great Britain Department of Environment entitled “Review of Rural Transport” that “the real trouble in assessing transport need in rural areas is due to the scattered nature and varied transit needs and that it is difficult to match together to form any sensible public transport load”.7

James Stoner and Vincenzo Milion in their study entitled “Behaviour Analysis of Travel and Activity – Determinants of Travel Choice” have concluded that “individual travel behaviour may be measured in four dimensions such as psychological (travel comfort), social (occupational status), economic (income level) and physical (trip frequency)”.8

In their paper “Predicting Demand for Rural Transit Systems” Burkhardt and Laga have focussed on the problems of rural passenger transportation in certain
technical as well as non-technical areas. The study reveals that technical issues such as planning techniques, resource requirements and performance standards and the non-technical areas progress very little as evidenced particularly in the areas of political leadership and financial stability. The study also reveals that 'costs can be influenced by one or more of the major factors like operating characteristics, regional characteristics, operating speed, environment, inflation, etc.'

Mahesh Chand in his study "Current Issues in Public Road Transport Management" has made an attempt to evaluate critically the pros and cons of nationalisation as well as the constraints of public transport management. He has highlighted its advantages to the economy and society and has emphasised that nationalisation of passenger road transport should be given a strong momentum to complete the process of the nationalisation at the earliest.

In a study entitled "Rural Transportation and Corporate Objectives" Shivaji Singh, M., has concluded that the low occupancy ratio and a low vehicle utilization due to shorter route lengths and bad condition of roads are the main reasons for the unprofitability of passenger transport service in rural areas.

Arasangovan, S.G., in his study "Rural Transport Planning and Operation" has suggested that rural public transportation can be evaluated by operators on revenue, cost factors - capital and operational, resource utilisation such as occupancy ratio, dead kilometres, better kilometres per litre and optimum utilisation of crew members. Evaluation of their performance with regard to commuters was done on the basis of quality and comfort of services.
such as convenience, reduced travel time, increased frequency, more comfortable seating, sufficient waiting time at stops, economic fare, dependability and safety.\textsuperscript{12}

In their article entitled "Factors Influencing the Transport Behaviour of Man" Panduranga Rao and Rama Rao have emphasised that geographical, environmental, social, cultural, economical, psychological factors and quality of service are influenced by the passengers' perception in travel behaviour. They have also suggested that various qualitative factors like time involvement in the journey, cost factor, frequency of service, dependability of service, convenience and comforts in the travel etc., will be carefully analysed by the users to make choice among available alternative modes. But they did not empirically test the relation between these factors and passengers' satisfaction.\textsuperscript{13}

Patankar, P.G., in his book entitled "Road Passenger Transport in India" has stated that the sub-standard roads in rural areas is the reason for the high operating cost and operation of buses in rural areas is not quite economical or efficient or safe for operations.\textsuperscript{14}

Patankar, P.G., in his study "Quality in Road Passenger Transportation" has emphasised on the need for quality in service sector, especially road transport. He has prescribed certain parameters to judge the quality of service offered by the transport undertakings such as punctuality, reliability, passenger amenities and comfort, incidence of breakdowns, accidents and nature and quantum of public
complaints. He has concluded with an appeal to the STUs to uphold the motto of "Service to Travellers".15

Arora, S.K., in his book "Economics of Management in Road Transport Industry" has focussed on the problems of management in the road transport industry in general and has suggested various techniques for the evaluation of STUs. Besides, he has made a comparative performance evaluation of Privately Managed Road Transport Industry vis-a-vis State Managed Industry in Punjab State and has concluded that both the public sector undertakings - Punjab Roadways and PEPSU Road Transport Corporation are operating much beyond their equilibrium levels and any further sanctioning of routes to them will only increase losses rather than yield profits. Only the private operators are operating below the equilibrium level and they have a scope for increasing their capacity utilisation and hence returns.16

Ratan Kumar Singh, in his study "Road Transport and Economic Development" has evaluated the critical role played by road transport as a basic infrastructure in economic development and has analysed the correlation between the development of road transport and that of other vital sectors of the economy in relation to Bihar State. He has pointed out that the condition of roads is not satisfactory, that most of the roads are unsurfaced, and that the development of roads in the State has not been well planned and co-ordinated with the economic development. He has also studied the functioning of Bihar State Road Transport Corporation as a case and has suggested certain guidelines for a suitable road
development policy for Bihar and the steps to be taken to improve the working and performance of the Bihar State Road Transport Corporation.\textsuperscript{17}

In a paper entitled “Road Transport and Rural Development in India” Munirathna Naidu, K., has mentioned that the operating cost in rural areas is high and uneconomical due to scattered and low density of population and uneconomic fare structure framed by the Government.\textsuperscript{18}

Sahabandhu, M.J., in his study entitled “Activity - Based Methodology to Ascertain Transportation Needs and Allocate Financial Support for Rural Bus Service” has discussed a variety of aspects like transportation needs, level of service, level of subsidy requirements, etc., related to rural transport. He has also stated that the regular conventional bus services cannot be served at acceptable costs to the commuters even though it is essential because dispersed irregular transport demand results in high operating cost in rural area.\textsuperscript{19}

Ganesan, R., has made a study of the “Economics of Rural Transportation”. In his study, he has stated that conventional buses would require certain minimum standard for optimum service functions in rural areas. He has also found out that the interior road condition in rural area results in higher depreciation, heavy fuel consumption and high cost of tyre wear and tear and lower vehicle utilisation per day due to lower speed.\textsuperscript{20}
Raman, A.V., in his paper “The Rationale of Nationalisation of Passenger Road Transport” has outlined the socio, economic and political advantages of STUs compared with those of private bus operators.\(^{21}\)

Sudarsanam Padam has made a study on “Nationalisation of Passenger Road Transport – Looking Back and Looking Forward”. In it, he has traced back the historical accounting of STUs and the circumstances under which it has been brought forth, so as to illustrate that public sector had to make inroads into bus transport industry because of the inability of the private sector to operate efficient and adequate services as well as to provide social welfare. He has also cautioned that any attempt to revive private sector would bring back the deficiency of private sector operation.\(^{22}\)

Anand Swaroop Behora in his paper on “Methodologies for Augmentation of Bus Services on Existing Routes in STUs” has suggested two models to work out augmentation of buses in STUs – one based on adequacy criteria and the other on breakdown concept. He argues that a balance has to be achieved between the two while finalising the plans of augmentation.\(^{23}\)

In a study entitled “Passenger Transport in India –A Customer Perspective” Raghunathan, et al., have attempted to determine the service conditions of bus travel in the major Indian States. The study covers 2763 kilometres of travel in RTC buses in the states of Gujarat, Madhya Pradesh, Rajasthan, Bihar, Uttar pradesh and Harayana for 8 days in the first stage and 2960 kilometres of travel in the states of Gujarat, Maharastra, Goa, Karnataka, Kerala and Tamilnadu for 6 days in the
second stage. The broad areas covered under this study are bus infrastructural features, conditions of terminals, crew behaviour and service characteristics. The study concludes that Road Transport Corporations have to improve safety features, terminal management, crew behaviour, service differentiation and pro-active market research.24

Thalavai Pillai, N., in his research study entitled “Transport Corporations in Tamilnadu – A Study of Performance of Pandiyan Roadways Corporation Limited and Cholan Roadways Corporation Limited” has made a comparative evaluation of the performance of two Transport Corporations owned by the Government of Tamilnadu. In this study, apart from the evaluation of physical, financial and social performance, the opinions of the bus users as well as the employees towards the working of the respective Corporations have also been dealt with. The study concludes that the service provided by PRC and CRC has been satisfactory in the city operation but not in rural transportation.25

The Expert Committee on Transport Sector (1990-91) has suggested that rural services can be defined in terms of the kilometres operated in the area of panchayat or panchayat union or in the area of any other local authority with a population exceeding 1000. The committee has also recommended to improve the rural bus service by increasing financial resources, one man operated buses, considerative fare fixation, etc., However, the committee has highlighted only the problems of the operators while plying services in rural areas.26
John Gunaseelan, G., has undertaken a research study on the “Performance of a Public Sector Passenger Road Transport Corporation: A Comparative Study of Passenger Satisfaction with Private Sector in North Arcot Region”. In it he observes that the Passenger-Satisfaction with the operation of PATC or Public Sector is marginally higher than that of private bus operation in North Arcot region.27

Baby, M., in her study entitled “A Study of Passenger Satisfaction with the Performance of Rural Transport Services by ATC, Salem” has attempted to identify the level of passenger satisfaction and the problems faced by rural passengers. She concludes that rural passengers are satisfied with the operating and service efficiency of ATC. They expect, however, as taxpayers, consumers and customers, some more efficient and adequate service, since the problems of passengers are many and varied. She has suggested that co-operation among the operators (ATC), crew, passengers and the Government is essential for ensuring quality of service.28

Sudarsanam Padam in his study entitled “Performance Criteria for Public Transport Organisations in Developing Countries - The Case of Bus Transport in India” has taken six criteria for judging the performance of public transport organisations. They are marketing and operational coverage, fleet performance, quality of service, personnel management, cost control and financial performance. He concludes that depending upon the operational environment and the challenges faced from time to time, transport organisations would need to prioritise or shift emphasis from one to the other, without altogether ignoring comprehensive assessment on the basis of the entire range of criteria. Greater emphasis needs to be
placed on efficient and effective utilization of resources at the disposal of transport organisations.  

A study entitled “Quality of STU Bus Services in Tamilnadu – An Assessment” by the Traffic and Transportation Research Wing of the Institute of Road and Transport, Madras, has stated that punctuality and reliability of bus services, crew behaviour, passenger comfort in the bus and incidence of accidents indicating safety are the key parameters for determining quality of services. In this study a SWOT analysis has been done on the basis of the response to a questionnaire and suggestions given by passengers at various bus stands. The study concludes that in the parameters like safety of passengers and their luggage, schedule adherence and punctuality, STU buses are rated better while in parametres like crew behaviour, vehicle cleanliness and journey comfort private buses are rated better.  

In a study entitled “Transport Management” Mohinder Singh has focussed on the working and operating efficiency of transport undertakings in land-locked and hilly geographical areas like Himachal Pradesh and Jammu and Kashmir. Variables like capacity development and its utilisation, cost analysis, revenue analysis, profitability analysis, service efficiency and productivity analysis have been made to evaluate the level of operating efficiency. He concludes that the operating efficiency and level of users’ satisfaction are not satisfactory.  

In the paper “Metro Services of APSRTC – Commuter Perceptions” Prashanta Athma has focussed on the satisfaction of commuters. She states that
commuters are not satisfied with the quality of service provided by STUs and has the following suggestions to offer: A Commuter Service Index should be developed on the basis of a thorough study conducted to identify the passenger related performance parameters; special cells could be set up by the Corporation for the receipt and redressal of commuter complaints and non-stoppage of buses at bonafide stops, breakdowns, accidents and crew indifference should be checked promptly.32

Bindu, M. and Sathikumar, R., in their paper “Ranking of Abstract Attributes of Commuters for Bus Trips in Thiruvananthapuram City” have examined the commuters’ choice of mode on the basis of abstract attributes like reliability, safety, comfort, convenience and behaviour of crew. They have found out that KSRTC service is more comfortable, convenient and safer than private bus service. Further, it has been found that though KSRTC service is appreciated for a better crew behaviour when compared with private bus service, the private bus service is considered more reliable than KSRTC service.33

Ramamoorthy, K. and Ponnuraj, S., in their research study entitled “Passenger Perception of Omnibus Services – An Analysis” have listed the perception factors of passengers towards omnibus service by adopting factor analysis techniques. They observe that comfortable seating arrangements, journey time, normal speed of the bus, politeness of the crew and cheaper rates when compared to train travel have high factor loading, which influence passenger perceptions to a great extent towards omnibus services. The study has proved that there is a significant relationship between passenger perception and physical
comfort, time and punctuality, safety, behaviour of the crew and social responsibility. But there is no significant variation between the perception level and the personal characteristic variables of passengers.34

The present study has been taken up and developed in this line as a tool of evaluating the performance of a Public Sector Road Transport Corporation in extending rural service.

SCOPE OF THE STUDY

The present study aims at identifying the area, extent and factors influencing satisfaction of passengers in rural transport services. An attempt is made to compare the passenger satisfaction regarding the quality of services rendered by SRTCs and private sector. The study also highlights the problems faced by rural passengers and to offer suggestions to improve the services rendered by SRTCs.

OBJECTIVES OF THE STUDY

The study is undertaken with the broad objective of evaluating the passenger satisfaction in rural transport services and the following are the specific objectives:

1. To study the general performance of Tamilnadu State Transport Corporation, (CBE DVN II) Ltd., Erode.

2. To examine the extent of passenger satisfaction and to identify the factors influencing satisfaction in rural transport services.
3. To identify the problems faced by the rural passengers.

4. To make a comparison of passenger satisfaction regarding the quality of service rendered by TSTC, (CBE DVN II) Ltd., Erode and private bus services.

5. To offer suggestions to improve the level of passenger satisfaction.

HYPOTHESES

The following workable hypotheses have been framed and tested in connection with the second objective of the study.

1. No significant relationship exists between personal factors and the level of satisfaction.

2. No significant relationship exists between transport-usage-related factors and the level of satisfaction.

PILOT STUDY AND PRETESTING

The Interview Schedule for collection of primary data was constructed by the researcher after proper observation of the area. Enquiries were made from passengers in order to identify the variables of the study. The District Transport Corporation Officials were also contacted to get the information needed for constructing the interview schedule. To conduct the pilot study 50 passengers were contacted covering 5 routes of Erode district. On the basis of the pilot study the interview schedule was modified suitably and finalised.
METHODOLOGY

Area of Study

Erode district, is purposively selected for the study as it covers mostly rural routes. Since the place of domicile of the researcher lies within the bounds of the area of study, it is expected that it would save time and cost of travel and would in turn allow more time for a detailed enquiry with the passengers. Erode district is located in the western part of Tamilnadu where the TSTC, (CBE DVN II) Ltd., Erode operates buses in 346 rural routes attached to 14 depots, situated at various places around the district. The co-operative attitude evinced by this local officers and passengers is yet another favourable factor in choosing the district, ultimately which would minimise response error and outliers in the collection of data.

Sources of Data

To accomplish the objectives of the study the researcher has to depend both on the primary and secondary data. The people of the district constitute the population of the study. The primary data are collected from the rural passengers by constructing a suitable interview schedule. The secondary data needed for the study are collected from the books, records, annual reports, etc., of TSTC (CBE DVN II) Ltd., Erode, journals and related Government Reports.

Period of Study

The study covers a period of five years from 1997-98 to 2001-02 with respect to secondary data. The primary data from respondents covers a period of one year, 2001-2002.
Sampling Procedure

Erode district is the universe for the study. The study is based on survey method. To collect the primary data, multi-stage-sampling technique has been adopted. The selection of samples is as explained below:

i) Identification of depots

Out of the total 16 depots of TSTC, (CBE DVN II) Ltd., Erode, 14 depots are identified as rural.

ii) Selection of depots

Out of 14 depots, 10 depots are included in the study and 4 are excluded; the reason for their exclusion being either they have a very low number of routes or they connect Erode district with nearby districts.

iii) Selection of routes

The selected 10 depots cover 285 routes. Approximately 10 per cent of the routes are selected at random so as to get a total of 30 routes.

iv) Selection of passengers

Out of the 30 selected routes, 10 passengers are selected at random from each sample route. Thus totally 300 passengers are chosen throughout Erode district. The passengers are contacted at different bus stops in selected routes.
The sample routes covered by the study are as detailed below in Table 1.1.

Table 1.1
Composition of Sample Routes

<table>
<thead>
<tr>
<th>S.No</th>
<th>Depot</th>
<th>Total Number of Routes</th>
<th>Sample Routes Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Erode - I</td>
<td>28</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>Erode - III</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Bhavani</td>
<td>33</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>Anthiyur</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>Kavindapadi</td>
<td>36</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>Gobichettipalayam</td>
<td>34</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>Nambiyur</td>
<td>35</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>Sathyamangalam</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>Kangeyam</td>
<td>40</td>
<td>4</td>
</tr>
<tr>
<td>10.</td>
<td>Dharapuram</td>
<td>29</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>285</td>
<td>30</td>
</tr>
</tbody>
</table>

QUANTIFICATION AND MEASUREMENT OF VARIABLES AND CONSTRUCTION OF SCALES

The broad objective of the study is to measure the level of satisfaction of the rural passengers. The level of satisfaction has been measured by constructing a scale. The scale consists of 5 components of satisfaction namely frequency of bus service, comfort and convenience, punctuality and regularity, safety and security and crew behaviour. Each component has further been subdivided into 10 sub components.
Likert Model is used to construct the scale. The response of the respondents has been elicited on a five point response category viz., highly satisfied, satisfied, no opinion, dissatisfied and highly dissatisfied for each component and they were scored 5,4,3,2 and 1, respectively.

The total of the scores of the ten sub components under each head constitutes the total satisfaction score for each passenger respondent for that component.

The total of the scores awarded for all the 50 sub-components under the five heads constitutes the total satisfaction score of each passenger respondent.

Validity of the Constructed Scale

The analysis in the study is based on the assumption of normal distribution. To determine whether the sample has come from normal distribution, or not, there are several checks, the important being measure of skewness and kurtosis. In this study the value of skewness is nearly zero (0.0261) and the measure of kurtosis is nearly 3 (2.8275). So the assumption of normal distribution is justified.

Relative Importance of Components of Passenger Satisfaction

In this study, five components are used to measure the passenger satisfaction. Regression analysis and Multiple Regression analysis with stepwise reduction have been carried out to identify the relative importance of different components of passenger satisfaction, for the purpose of inclusion in the scale.
The results of Regression analysis and Multiple Regression with stepwise reduction method are presented below:

Table 1.2
Regression Analysis of Components of Passenger Satisfaction

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression Coefficient</th>
<th>S.Eb</th>
<th>‘t’- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>5.682 E - 14</td>
<td>0.0000002522</td>
<td>0.000</td>
</tr>
<tr>
<td>Frequency of bus service</td>
<td>1.000</td>
<td>0.0000000070</td>
<td>1.4 E+08*</td>
</tr>
<tr>
<td>Comfort and Convenience</td>
<td>1.000</td>
<td>0.0000000069</td>
<td>1.4 E+08*</td>
</tr>
<tr>
<td>Punctuality and Regularity</td>
<td>1.000</td>
<td>0.0000000089</td>
<td>1.1E+08*</td>
</tr>
<tr>
<td>Safety and Security</td>
<td>1.000</td>
<td>0.0000000086</td>
<td>1.2 E+08*</td>
</tr>
<tr>
<td>Crew Behaviour</td>
<td>1.000</td>
<td>0.0000000092</td>
<td>1.1E+08*</td>
</tr>
</tbody>
</table>

* Significant at 1 per cent level

R = 1.000  \hspace{1cm} R^2 = 1.000

Percentage of predictability = 100 per cent

Value of F = 9.1 E + 16*

The value of $R^2$ indicates how much variation in the dependent variable $Y$ is explained by the fitted Multiple Regression Model. The above results indicate that $R^2 = 1.000$; that is all the five independent variables together influence the total satisfactions of the passengers in Total (100 per cent)

F statistic is used (to test the value of R) to know how effective is the Multiple Regression Model. The computed value of F (9.1E +16) is larger than the
tabulated value of $F$ (3.04) at 1 per cent level of significance for (5, 294) degrees of freedom. Therefore, it is concluded that the regression model is very effective and there is a linear significant relationship between the dependent variable and independent variables.

The student ‘t’ test has been used to test the results of Regression Coefficient. The observed values of Regression Coefficient are compared with table value of ‘t’ at 1 per cent level of significance for 294 degrees of freedom. The student ‘t’ test reveals that the calculated value of ‘t’ exceeds the Table value of ‘t’ (2.58) at 1 per cent level.

Therefore, it is concluded that all the Regression Coefficients indicate a significant linear relationship between the dependent variable and the independent variables considered in this study.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Variable</th>
<th>$R$</th>
<th>$R^2$</th>
<th>Increment</th>
<th>Per cent explained</th>
<th>F value</th>
<th>S / NS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$X_1$</td>
<td>0.67753</td>
<td>0.4590</td>
<td>-</td>
<td>45.90</td>
<td>252.878</td>
<td>S</td>
</tr>
<tr>
<td>2</td>
<td>$X_2$</td>
<td>0.88319</td>
<td>0.7800</td>
<td>0.3210</td>
<td>32.10</td>
<td>526.574</td>
<td>S</td>
</tr>
<tr>
<td>3</td>
<td>$X_3$</td>
<td>0.93218</td>
<td>0.8690</td>
<td>0.0890</td>
<td>8.90</td>
<td>654.275</td>
<td>S</td>
</tr>
<tr>
<td>4</td>
<td>$X_4$</td>
<td>0.98696</td>
<td>0.9740</td>
<td>0.1050</td>
<td>10.50</td>
<td>2772.287</td>
<td>S</td>
</tr>
<tr>
<td>5</td>
<td>$X_5$</td>
<td>1.00000</td>
<td>1.0000</td>
<td>0.0260</td>
<td>2.60</td>
<td>9.1E + 16</td>
<td>S</td>
</tr>
</tbody>
</table>

It is evident from Table 3.49 that all the independent variables considered in the study have significant influence on the dependent variable.
Of the independent variables contributing to passenger satisfaction nearly 46 per cent is accounted for by the variable frequency of bus service followed by satisfaction on comfort and convenience of travel which accounts for 32 per cent; while the other three independent variables contribute for the rest 22 per cent.

**Framework of Analysis**

The collected data are analysed with reference to the specific objectives of the study. Conventional tools of analysis like descriptive analysis, percentage analysis, diagrams and graphs are used. Further, the following statistical tools are also made use of to complete the study.

5 point scaling technique is used to convert the qualitative data into quantitative one and the weighted average score is used to determine the level of satisfaction of the respondents on various issues.

Analysis of Variance techniques is used for testing the significance of relationship between independent and dependent variables.

Multiple Linear Regression is used to find out the functional relationship between the variables. Stepwise Regression is also used to determine the degree of influence of each variable on the dependent variable considered in the study.
OPERATIONAL DEFINITIONS

Passenger
A passenger means any person travelling in a rural TSTC (CBE DVN II) Ltd., Erode bus other than the driver or the conductor or an employee of the permit holder while on duty.

Passenger satisfaction
Passenger satisfaction means the satisfaction derived by the individual passenger in rural routes.

Rural Routes
Rural routes mean specific bus routes originating from the town or otherwise covering a maximum distance of only 30 kilometres within which atleast 50 per cent of the distance lies outside the municipal limit. All the town routes operated by TSTC (CBE DVN II) Ltd., Erode are rural routes.

Depot
This term refers to the organisational unit of a transport undertaking directly responsible for the operation of the bus service.

Personal Factors
This terminology has been used to mean the socio-economic characteristics of the passengers such as age, gender, education, occupation, income, marital status, size of family and location of residence.
Transport-usage related factors

This term had been used to mean the various aspects of relationship between the passenger and transport service such as purpose of travel, reasons for preferring bus travel, availability of other modes of transport, time of travel, possession of own vehicle, average distance of travel per day and bus fare structure.

Low level satisfaction

The respondents' satisfaction scores up to mean minus standard deviation are grouped as low.

Moderate level satisfaction

The respondents' mean scores between mean minus standard deviation and mean plus standard deviation are grouped as moderate.

High level satisfaction

The respondents' satisfaction scores above mean plus standard deviation are grouped as high.

TSTC Erode

Refers to Tamilnadu State Transport Corporation (Coimbatore Division II) Limited, Erode.

Private Bus Services

Buses operated by private operators.
LIMITATIONS OF THE STUDY

It is but natural that any research investigation suffers from certain limitations, which warrant an attitude of caution and healthy skepticism about its findings. Such limitations are of two categories; those which arise from uncontrollable factors and those which arise from self imposed restriction by the investigator for various reasons. This study is subject to the following limitations:

The size of the sample, nature of the tools and the limitations in the number of variables studied are limitations of the first category.

The second category includes the deliberate decision to focus the attention on passenger satisfaction excluding many other aspects. The passenger satisfaction being a psychological factor, the tool adopted to measure it is subjective rather than an objective one.

Another limitation is that the reliability of the study depends on the true response of the passengers.

Just before the completion of the study, the State Government has taken a decision to denationalise a part of the Public Sector Transport. This has not been taken into account by the study.
CHAPTER SCHEME

The study is presented in six chapters. The first chapter consists of the introduction and design of the study covering the review of literature, statement of the problem, objectives of the study, hypotheses, methodology, framework of analysis, limitations of the study and chapter scheme.

The second chapter is confined to the performance of TSTC Erode.

The third chapter deals with the extent of passenger satisfaction and the determinants of passenger satisfaction in rural transport services.

The problems faced by the rural passengers are presented in the fourth chapter.

The fifth chapter is assigned for comparison of passenger satisfaction regarding the quality of service rendered by TSTC Erode and private bus services.

The sixth chapter recapitulates the key findings of the study and offers suggestions to improve passenger satisfaction in rural transport services.
References


