# A Study on Passengers' Satisfaction provided by Bus Operators in Tamil Nadu

**K. Prabhakar Rajkumar***

## Abstract

Roads and highways are considered as veins and arteries of a transported are likened to blood in circulation, enlivening economic activity of the country. Tamil Nadu has a well established transportation system that connects all parts of the state. The Government of Tamil Nadu is one of the first States to take a bold decision of encouraging the private and public sector  co-operation for bolstering the infrastructure of the State. The road network of the Tamil Nadu has been influencing considerably the economic development, population distribution, shape of city, environmental quality, energy consumption, access to social infrastructure and above all the quality of life. Generally, the passengers have various problems in traveling in public and private sector bus transport service and this study is focused to measure the various problems and suggest ways to reduce problems and to provide higher satisfaction, in addition to identifying the level of satisfaction and preference of passengers towards the services provided by public and private sector bus transport services in Tamil Nadu.

## Introduction

In the economic activity of the modern society, like the transfer of the goods and technology, the human mobility plays an important role and this mobility of people has become a part of history of modern civilization. Roads and highways are considered as veins and arteries of a transported are likened to blood in circulation, enlivening economic activity of the country and passenger road transport service is an essential concomitant of economic development and it must keep pace with the growing requirement. Passenger bus transport is an important mode for mobility with its consequential benefits in the upgradation of the economy of the nation. Millions of people use this mode of service every day. It is a globally admitted fact that moving through mass transport system is cheaper and will be better in the interest of the nation than moving through personalized modes of transport. However, this sector also accounts for a substantial and growing proportion of air pollution in cities.

## Statement of the Problem :

Tamil Nadu Road Transport offers a most efficient and sophisticated means of

* Assistant Professor, Department of Commerce, Periyar University, Salem - 636011, Tamil Nadu, e-mail : kudalkprk6@yahoo.com.in

communication that provides passengers with an easy and comfortable journey. Tamil Nadu has a well established transportation system that connects all parts of the state. Tamil Nadu is served by an extensive road network, providing links between urban centers, agricultural market-places and rural areas. There are 24 national highways in the State, covering a total length of 2,002 km. The state has a total road length of 167,000 km, of which 60,628 km are maintained by Highways Department. This is nearly 2.5 times more than the density of all-India road network. Government of Tamil Nadu is one of the first States to take a bold decision of encouraging the private and public sector co-operation for bolstering the infrastructure of the State. It operates buses along intra and inters State bus routes. In Tamil Nadu alone, as on March 2010, there are 20,500 buses owned by State Transport Corporation and 1.3 Lakhs employees are working. On other hand 6,840 buses are operated by about 2,210 private owners and 24,000 employees are working there. Tamil Nadu Bus Transport Corporation was the first in India to introduce excellent paintings in buses. The main divisions are located in Chennai, Villupuram, Kumbakonam, Tamil Nadu, Coimbatore and Madurai. Tamil Nadu government undertakes for operating long distance express services, connects the entire district Headquarters in the state of Tamil Nadu. The transport Corporation operates long distance buses exceeding 250 kms. and above throughout the state of Tamil Nadu linking all important capital cities, historical places, religious and commercial places and even adjoining States. The public and private bus transporters are operating Super, Ultra and Semi- Deluxe, Video coach, and Air suspension bus services.

Generally, the passengers have various problems in traveling in public and private sector bus transport service, like uncomfortable seats, over speed, lacking in time keeping and safety and reliability aspects, unfair bus fare and inadequate bus service during peak hours etc. Hence this study is focused to measure the various problems and suggest ways to reduce problems and to provide higher satisfaction, in addition to identifying the level of satisfaction and preference of passengers towards the services provided by public and private sector bus transport services.

## Research Methodology

### Objectives
The objectives of the study are
1. To find the preference of journey on Public and Private sector transport service providers.
2. To measure the satisfaction level of passenger towards the public and private transport service sector.
3. To identify the factors which are more influencing the passengers' attitude towards public and private transport service.

**Sampling Technique**

The total population is initially divided into areas in Tamil Nadu. A sample of 150 passengers were selected on convenience basis, because sampling frame was not available. The passengers who were travelled in the long distance buses, owned by public and private sectors were asked to respond the interview schedules immediately after they have completed their journey at the normal time in the normal days. In Chennai 56, Madurai 25, Trichy 23 and Coimbatore 46 passenger respondents were collected during three months period of time from July to September 2010.

## Data Analysis and Interpretation

**Profile of the Passengers**

The researcher interviewed 150 passengers with the help of interview schedules covering questions related to the service provided by public and private sector transport services. Out of the 150 respondents (passengers) 82 (55%) availed services from public sector bus operators and 68 (45%) private sector bus operators. The age of the respondents concern, below the age group of 20, in case of public sectors were 22 and in case public sectors were 17. The respondents' age between 21 to 30, in case of public sector -23 and private sectors -29. The age between 31 to 40, public sector – 16 and private sector – 18. The age between 41-50, public sector – 10 and private sector – 1. The 50 and above age group of the respondents in case of public sector – 11 and private sector 3. The total male respondents in case of public sector were 41 and private sector were 44 and female respondents were 41 and 24 respectively. The occupation status of the respondents, in case of public sector, business -15, employees -26, professional -8 and others were 33 and in case of private sector, business -14, employees -24, professional -9 and others were 21. The classification in monthly income point of view, in case of public sector, below Rs. 5,000 -43, Rs.5,000 to Rs. 10,000 – 19, Rs. 10,000 to Rs. 15,000 – 13, Rs. 15,000 to Rs.20,000 -2 and above Rs.20,000 -5. In case of private sector, below Rs. 5,000 -21, Rs.5,000 to Rs. 10,000 – 31, Rs. 10,000 to Rs. 15,000 – 2, Rs. 15,000 to Rs.20,000 -9 and above Rs.20,000 -5. The traveling frequency of the respondents, in case of public sector, daily -36, weekly -19, monthly -7 and rarely 20. In case of private sector, daily -25, weekly -23, monthly -13 and rarely 7.

**Association between Personal Profile Factors of the Passengers and Preferences on Transport Service Providers**

The association between the Preferences of journey, opinion on maximum service provider and the personal profile factors namely Age, Gender, occupation, Monthly income and Traveling

occasion was analyzed in this section. The chi-square test is used at 5% level of significance.

**Null Hypothesis: H$_o$ :** There is no association between Age, Gender, Occupation and Monthly income of the passengers and their preferences on transport service providers.

### Table .6 Personal Profile Factors *Preferences of service providers

|  | Value | df | P value | Remark |
|---|---|---|---|---|
| Age | 12.186 | 4 | .016 | Significant |
| Gender | 3.274 | 1 | .070 | Not Significant |
| Occupation | 1.547 | 3 | .672 | Not Significant |
| Monthly income | 21.847 | 4 | .000 | Significant |

**Null Hypothesis: H$_o$ :** There is no association between Traveling frequency and Preferences on service providers.

### Table .7 Traveling frequency * Preferences on service providers

|  | Value | df | P value | Remark |
|---|---|---|---|---|
| Traveling frequency | 9.197 | 3 | .027 | Significant |

**Test for mean scores of satisfaction on journey with respect to public and private sector service providers.**

**Null Hypothesis**: H$_{0:}$ There is no significant difference between the mean scores of public and private sector regarding satisfaction of the passenger on journey.

### Table .8   t-test-Group Statistics – Sector * Satisfaction on journey

| Sector | N | Mean | Std. Deviation | Std. Error Mean | t | df | P value | Remark |
|---|---|---|---|---|---|---|---|---|
| Public | 149 | 61.26 | 12.419 | 1.017 | .736 | 297 | .462 | Not Significant |
| Private | 150 | 60.13 | 14.020 | 1.145 | | | | |

The P value is greater than 0.05, we accept the hypothesis. Hence there is no significant difference in the mean scores of two groups with respect to satisfaction.

**Test for mean scores of satisfaction on journey and Age, Occupation, Monthly income and travelling occasion of group of the passengers.**

**Null Hypothesis**: H$_0$ : There is no significant difference between the mean scores of Age, Occupation, Monthly income and Traveling frequency groups regarding satisfaction on journey.

**Table .9 ANOVA Group Statistics –Age * satisfaction on journey**

| | Age | N | Mean | Std. | Std. | F | P value | Remark |
|---|---|---|---|---|---|---|---|---|
| Public | Below 20 | 39 | 63.72 | 12.837 | 2.056 | 1.578 | .183 | Not Significant |
| | 21 - 30 | 52 | 59.94 | 9.916 | 1.375 | | | |
| | 31 - 40 | 34 | 60.47 | 11.848 | 2.032 | | | |
| | 41 - 50 | 11 | 67.36 | 12.019 | 3.624 | | | |
| | Above 50 | 14 | 57.43 | 19.070 | 5.097 | | | |
| | Total | 150 | 61.35 | 12.436 | 1.015 | | | |
| | **Age** | **N** | **Mean** | **Std.** | **Std.** | **F** | **P value** | **Remark** |
| Private | Below 20 | 39 | 63.72 | 14.004 | 2.242 | 3.036 | .019 | Significant |
| | 21 - 30 | 52 | 60.63 | 11.441 | 1.587 | | | |
| | 31 - 40 | 34 | 61.29 | 12.540 | 2.151 | | | |
| | 41 - 50 | 11 | 51.73 | 15.291 | 4.610 | | | |
| | Above 50 | 14 | 52.00 | 20.324 | 5.432 | | | |
| | Total | 150 | 60.13 | 14.020 | 1.145 | | | |

Since the P value is greater than 0.05 and accept the hypothesis. Hence there is no significant difference in the mean scores of age groups with respect to the satisfaction on journey regarding the public sector. But since the P value is less than 0.05, we reject the hypothesis. Hence there is significant difference in the mean scores of age groups with respect to the satisfaction on journey regarding the private sector.

Once we have determined that differences exist among the means, post hoc range tests can determine which means differ. Duncan's tests identified the homogeneous subsets of means that are not different from each other and the results are given below.

**Post Hoc Tests-Homogeneous Subsets-satisfaction on journey-Private**

Tukey B

| Age | N | Subset for alpha = .05 | |
|---|---|---|---|
| | | 1 | 2 |
| 41 - 50 | 11 | 51.73 | |
| Above 50 | 14 | 52.00 | |
| 21 - 30 | 52 | 60.63 | 60.63 |
| 31 - 40 | 34 | 61.29 | 61.29 |
| Below 20 | 39 | | 63.72 |

The table shows that there is no significant difference in the mean scores of satisfaction on journey among the age groups of 20 and above. But these groups significantly differ with the age group below 20 years.

### Table 10.  ANOVA Group Statistics – Occupation * satisfaction on journey

|  | Occupation | N | Mean | Std. Deviation | Std. Error | F | P value | Remark |
|---|---|---|---|---|---|---|---|---|
| Public | Business | 29 | 60.48 | 13.190 | 2.449 | .658 | .579 | Not Significant |
|  | Employees | 50 | 62.72 | 10.130 | 1.433 |  |  |  |
|  | Professional | 17 | 63.47 | 11.812 | 2.865 |  |  |  |
|  | Others | 54 | 59.89 | 14.144 | 1.925 |  |  |  |
|  | Total | 150 | 61.35 | 12.436 | 1.015 |  |  |  |
|  | Occupation | N | Mean | Std.Deviation | Std. Error | F | P value | Remark |
| Private | Business | 29 | 62.79 | 13.718 | 2.547 | .747 | .526 | Not Significant |
|  | Employees | 50 | 58.22 | 13.022 | 1.842 |  |  |  |
|  | Professional | 17 | 61.88 | 12.524 | 3.038 |  |  |  |
|  | Others | 54 | 59.91 | 15.515 | 2.111 |  |  |  |
|  | Total | 150 | 60.13 | 14.020 | 1.145 |  |  |  |

The P value is greater than 0.05 for both public and private sector and there is no significant difference in the mean scores of occupation groups with respect to the satisfaction on journey. Hence the related hypothesis was accepted.

|  | Income | N | Mean | Std. Deviation | Std. Error | F | P value | Remark |
|---|---|---|---|---|---|---|---|---|
| Public | Below 5000 | 64 | 61.09 | 13.756 | 1.720 | 1.343 | .257 | Not Significant |
|  | 5000 - 10000 | 50 | 60.72 | 10.274 | 1.453 |  |  |  |
|  | 10000 - 15000 | 15 | 65.33 | 9.394 | 2.425 |  |  |  |
|  | 15000 - 20000 | 11 | 55.91 | 16.251 | 4.900 |  |  |  |
|  | Above 20000 | 10 | 66.20 | 11.783 | 3.726 |  |  |  |
|  | Total | 150 | 61.35 | 12.436 | 1.015 |  |  |  |
|  | Income | N | Mean | Std. Deviation | Std. Error | F | P value | Remark |
| Private | Below 5000 | 64 | 59.19 | 14.392 | 1.799 | .826 | .510 | Not Significant |
|  | 5000 - 10000 | 50 | 60.04 | 13.265 | 1.876 |  |  |  |
|  | 10000 - 15000 | 15 | 63.00 | 14.653 | 3.783 |  |  |  |
|  | 15000 - 20000 | 11 | 56.73 | 14.846 | 4.476 |  |  |  |
|  | Above 20000 | 10 | 66.00 | 13.960 | 4.415 |  |  |  |
|  | Total | 150 | 60.13 | 14.020 | 1.145 |  |  |  |

The P value is greater than 0.05 for both public and private sector and there is no significant difference in the mean scores of monthly income groups with respect to the satisfaction on journey. Hence the related hypothesis was accepted.

**Table 12.  ANOVA Group Statistics –Traveling Frequency*satisfaction on journey**

| | Traveling Frequency | N | Mean | Std. Deviation | Std. Error | F | P value | Remark |
|---|---|---|---|---|---|---|---|---|
| Public | Daily | 61 | 62.51 | 12.674 | 1.623 | 1.398 | .246 | Not Significant |
| | Weekly | 42 | 58.07 | 12.934 | 1.996 | | | |
| | Monthly | 20 | 63.40 | 7.294 | 1.631 | | | |
| | Rarely | 27 | 62.33 | 13.717 | 2.640 | | | |
| | Total | 150 | 61.35 | 12.436 | 1.015 | | | |
| | **Traveling Frequency** | **N** | **Mean** | **Std. Deviation** | **Std. Error** | **F** | **P value** | **Remark** |
| Private | Daily | 61 | 61.57 | 13.765 | 1.762 | 4.215 | .007 | Significant |
| | Weekly | 42 | 62.38 | 15.426 | 2.380 | | | |
| | Monthly | 20 | 62.30 | 7.512 | 1.680 | | | |
| | Rarely | 27 | 51.74 | 13.527 | 2.603 | | | |
| | Total | 150 | 60.13 | 14.020 | 1.145 | | | |
| | Total | 150 | 60.13 | 14.020 | 1.145 | | | |

The P value is greater than 0.05 for public sector and there is no significant difference in the mean scores of traveling frequency with respect to the satisfaction on journey. Hence the related hypothesis was accepted. But in case for Private sector, the P value is less than 0.05 and there is significant difference in the mean scores of traveling frequency with respect to the satisfaction on journey regarding the private sector. Hence the related hypothesis was rejected.

**Post hoc range tests**
**Post Hoc Tests-Homogeneous Subsets-satisfaction on journey -Private**
**Tukey B**

| Travelling Occasion | N | Subset for alpha = .05 | |
|---|---|---|---|
| | | 1 | 2 |
| Rarely | 27 | 51.74 | |
| Daily | 61 | | 61.57 |
| Monthly | 20 | | 62.30 |
| Weekly | 42 | | 62.38 |

The table shows that there is no significant difference in the mean scores of satisfaction on journey among the traveling frequency of daily, monthly and weekly. But these groups significantly differ with the traveling frequency of rarely.

**Influencing Factors towards the Attitude**
To identify the factor which is more influencing the passenger attitude towards public sector, the Friedman's test analysis was used.

**Table13. Friedman Test – Satisfaction on journey (Public) Descriptive Statistics**

| Factors | N | Mean | Std. Deviation | Mean Rank | ?²square value | df | P value |
|---|---|---|---|---|---|---|---|
| Comfortable Traveling | 150 | 3.79 | 1.084 | 11.09 | | | |
| Ticket Availability | 150 | 3.55 | 1.090 | 10.15 | | | |
| Speed | 150 | 3.21 | 1.133 | 8.55 | | | |
| Entertainment | 150 | 3.21 | 1.172 | 8.38 | | | |
| Time Keeping | 150 | 3.24 | 1.299 | 8.81 | | | |
| **Fair Bus fare** | **150** | **3.92** | **1.000** | **11.91** | | | |
| **Safety and Reliability** | **150** | **3.78** | **1.098** | **11.25** | | | |
| Customer Care | 150 | 3.39 | 1.263 | 9.50 | | | |
| Cleanliness | 150 | 2.95 | 1.230 | 7.38 | | | |
| Maintenance | 150 | 3.00 | 1.164 | 7.37 | 249.129 | 17 | 0.000 |
| Undisturbed Travel | 150 | 3.22 | 1.134 | 8.56 | | | |
| **Obeying the traffic Rules** | **150** | **3.74** | **1.261** | **11.34** | | | |
| **Experienced Drivers used** | **150** | **3.87** | **1.160** | **11.96** | | | |
| Frequent accidents | 150 | 3.39 | 1.214 | 8.99 | | | |
| Attending to the complaints immediately | 150 | 3.19 | 1.283 | 8.44 | | | |
| Pleasant customer approach | 150 | 3.27 | 1.164 | 8.80 | | | |
| Exploiting the passenger | 150 | 3.07 | 1.384 | 8.24 | | | |
| Arrangement of Excess bus | 150 | 3.57 | 1.287 | 10.29 | | | |

It could be noted; from the above table that among the eleven factors **experienced drivers used** was ranked first. It is followed by the **fair bus fare**. **Obeying the traffic rules** was ranked third. The least rank went to **maintenance**.

**Influencing Factors towards the preference of private service provider**

**Table 14. Friedman Test – Satisfaction on journey (Private) Descriptive Statistics**

| Factors | N | Mean | Std. Deviation | Mean Rank | $\chi^2$ square value | df | P value |
|---|---|---|---|---|---|---|---|
| **Comfortable Travelling** | **150** | **3.95** | **1.032** | **12.13** | | | |
| Ticket Availability | 150 | 3.81 | 1.013 | 11.40 | | | |
| **Speed** | **150** | **3.87** | **1.143** | **11.75** | | | |
| **Entertainment** | **150** | **3.89** | **1.138** | **11.81** | | | |
| Time Keeping | 150 | 3.79 | 1.183 | 11.47 | | | |
| Fair Bus fare | 150 | 3.52 | 1.163 | 10.18 | | | |
| Safety and Reliability | 150 | 2.99 | 1.237 | 7.95 | | | |
| Customer Care | 150 | 3.23 | 1.292 | 9.15 | | | |
| Cleanliness | 150 | 3.70 | 1.225 | 11.18 | 367.446 | 17 | 0.000 |
| Maintenance | 150 | 3.66 | 1.247 | 10.88 | | | |
| Undisturbed Travel | 150 | 3.07 | 1.151 | 8.26 | | | |
| Obeying the traffic Rules | 150 | 2.87 | 1.230 | 7.59 | | | |
| Experienced Drivers used | 150 | 2.80 | 1.385 | 7.40 | | | |
| Frequent accidents | 150 | 2.79 | 1.387 | 7.11 | | | |
| Attending to the complaints immediately | 150 | 3.13 | 1.387 | 8.31 | | | |
| Pleasant customer approach | 150 | 3.11 | 1.306 | 8.40 | | | |
| Exploiting the passenger | 150 | 3.13 | 1.382 | 8.70 | | | |
| Arrangement of Excess bus | 150 | 2.82 | 1.351 | 7.33 | | | |

It could be noted from the above table that among the eleven factors **comfortable travelling** was ranked first. It was followed by the **entertainment**, **speed** which was ranked third. The least rank went to **experienced drivers used**.

## Findings of the Study

- It is found from the analysis that among the passengers who prefer Public sector 28 per cent of the passengers belong to the age group of 21-30 years. In private sector 34.7 per cent of the passengers belong to the age group of 21-30 years. Among the users of public sector 50 percent were male passengers and 50 percent of them were female passengers. Similarly in private sector 64.7 per cent of passengers were male and 35.3 per cent of passengers were female. The passengers who prefer Public sector have monthly income of below Rs 5,000 (52.4 per cent). In Private sector, they have monthly income of Rs. 5,000 – 10,000 (45.6 per cent). Among the users in Public sector 43.9 percent of the passengers travel daily and in Private sector 36.8 per cent of the passengers travel daily.
- It is concluded that there is close relationship between the age, income and traveling

frequency of the passengers and preferences of service providers. Whereas, there is no close relationship between the gender and occupation of the passengers and preferences of service provider. From the analysis that there is no significant difference in the mean scores of Public and Private sector with respect to satisfaction on journey. There is significant difference in the mean scores of travelling frequency with respect to the satisfaction on journey regarding the Private sector. But, there is no significant difference in the mean scores of traveling frequency with respect to the satisfaction on journey regarding the Public sector.

- There is no significant difference in the mean scores of satisfaction on journey among the traveling frequency of daily, monthly and weekly. But these groups significantly differ with the traveling frequency of rarely.

- To identify the factor which is more influencing the passenger attitude towards Public sector, among the eleven factors, experienced drivers used is ranked first and followed by the fair bus fare and obeying the traffic rules is ranked second and third. The least rank went to maintenance of bus. In case for Private sector, among the eleven factors, comfortable traveling is ranked first and followed by the entertainment and speed is ranked second and third. The least rank went to experienced drivers used.

## Suggestions to the Bus Operators

The study is a rewarding exercise in the sense that, in addition to identifying the factors which influence the passengers, it also brings out the problems encountered by the passengers from various angle. This has enabled the researcher to give certain practical solutions to the problems encountered by the passengers, namely, seat space inside the bus, particularly in Public sector buses, is very limited and causes a lot of inconvenience while travelling and hence there is need for a change in the seating arrangements in the Public sector buses. In Public sector buses there is lack of neatness, cleanliness. First aid medical service equipments, medicines and pure drinking water must be made available in buses at all times. In selecting bus crew the bus operators must take care in choosing efficient, qualified and experienced drivers and conductors. The bus operators can make arrangements for monthly or half-yearly meetings of the passengers and bus crew. The Private sector must avoid the tendency to exploit passengers during times of festivals and other local functions. For the convenience of the public, both Private and Public sector must operate extra buses and arrange for extra trips during festivals and peak hours. The bus crews patronize a particular hotel which favours them but charging exorbitant rate from passengers and serving unhygienic food to them. This should be avoided. Bus crews must be trained to maintain very good human relations with passengers, especially with disabled, old, sick and female passengers.

## Conclusion

At present the. Private sector transport services in Tamil Nadu, to certain extent, are functioning satisfactorily; but the quality of service provided by the Public sector is not commendable. The Public sector bus services in the city must improve the quality of their services so that they can put up a tough competition to the Private sector providing maximum benefit to the passengers in the State.

## Bibliography

1. B.N. Swami, "Measurement of Operational Efficiency of Road Transport Industry through variance analysis", Journal of Transport Management, September 1990, pp-12-17

2. D.T Hartgen and G.R Tanner, "Investigations of the effect of traveler attitude in a model of mode choice behavior" Highway Research Record 369, May 1971.

3. D. Panduranga Rao and B. Rama Rao, "Factors influencing the transport behavior of man", Journal of transport management, June 1984. pp 23-27.

4. Hanumantha Rao Ch., "Nationalized Passenger Road Transport in India-A Perspective", Journal of transport management, May.1990, pp-18-24.

5. http://www.tnstc.in.

6. http://en.wikipedia.org/wiki/Tamil Nadu.

7. K.C. Kotsiopoulos, "Determining Transportation needs", traffic quarterly, July1980.

8. L.S. Predergast and R.D. Williams, An Empirical Investigation into the Determinant of Travel time, (Crowthorne department of the environment and transport, Transport and Road Research Laboratory SR 555, 1980).

9. M.G.Devashayam "State Transport Making Undertakings Profitable", Economic Times, 2nd December 1983.

10. P.G. Patankar, "Quality in Road Passenger Transportation", Journal of Transport Management, November1986, pp 9-11.

11. P.Jegadish Gandhi, "State Transport Undertakings in Southern States-A Comparative Study", Southern Economist, Oct 1989, pp 21-26.

12. P.Jegadish Gandhi and G.John Gunaseelan, "Operational Dynamics of STUs in Tamilnadu, "Journal of Transport Management, August 1990, pp 18-25.

13. Padam Sudarsanam, "Nationalization of Passenger Road Transport, looking back and looking forward", Journal of Transport Management, November 1990, pp 7-10.

14. P.Jegadish Gandhi and G.John Gunaseelan, "Performance Evaluation of STUs in Tamil Nadu", Indian Transport System, Mittal Publications, 1994

15. Swaroop Behara Anand, "Methodologies for Augmentation of Bus Services on existing routes in STUs", Journal of Transport Management, September 1991, pp 14-19.

16. V.Nagarajan and Hanumantha Rao, "Road Transport Nationalization", Journal of Transport Management, April 1990, pp 15-19.

17. V.Raghunathan, "Passenger Transport in India-A Customers' Perspective", Journal of Transport Management, September 1991, pp 18-26.