

# Operational Efficiency of State Transport Undertaking of Tamil Nadu

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## Abstract

The Nation's transportation system is a major component of the national economy and an important factor in shaping out people's life style, community development and industry location patterns. Operational efficiency is the centre nerve of transport system. The indices used in the present study suggest a number of steps which could profitably be used for better efficiency and faster growth of transport undertakings. Even though TNSTC was earning huge amount total revenue through transport service they were in carrying loss because of maintained cost, breakdown, personnel cost.

**Key words:** State Transport Undertaking, Operational Efficiency, Fleet Utilization, Vehicle Utilization, Effective Kilometer

## **Introduction**

An efficient and well developed system of transport is vital to the success of economic development. Among the various modes of transport, road transport plays a very important role in economic development. Further, road transport provide one of the basic infrastructure for economic development of backward areas and serve as a feeder service to rail traffic, ports and harbours and airports. The operational efficiency of any undertaking can be viewed from several sides and angles. Hence, the operational efficiency of the State Road Transport Corporation also can be judged taking three aspects viz. financial performance, physical performance and value added analysis. Operational efficiency is the centre nerve of transport system. The indices used in the present study suggest a number of steps which could profitably be used for better efficiency and faster growth of transport undertakings. It gives a detailed and analytical study and some ideas for overall improvement in the working of State Transport Undertaking. It is judged by the quality of service.

### **Parameters of Efficiency**

The parameters of efficiency can be divided into input parameter and output parameters. Input parameters of efficiency refer to the ability of transport systems to use their resources, or factors of production, for transport service includes labour, equipment, capital and energy. The output parameters of efficiency refer to the ability of transport system to maximize their output given their resources or factors of production, for transport service, which is otherwise referred to as “Public Transport Efficiency”. Public transport is not constrained and influenced by the same forces that govern private enterprise. Due to transport’s ability to make use of government subsidy to cover some of its losses, the service it provides may or may not reflect the desires and needs of society. That is, the distinction between quantity and quality is important because more (or less) transport does not necessarily imply better (or worse) transport.

### **Measurement of Operational Efficiency**

The following parameters are suitable for the measurement of the operational efficiency.

1. Volume of Operation
2. Fleet Utilization
3. Vehicle Utilization
4. No. of Passengers carried daily
5. Total Revenue
6. Revenue /Passengers Carried
7. Manpower Productivity
8. Revenue per Effective Kilometer
9. Cost per Effective Kilometer
10. Profit /Loss per Effective Kilometer

### **Volume of Operation**

Volume of operation states that kilometers actually operated by public service vehicle for purpose of earning revenue are known as effective kilometers. Effective kilometers are also termed as ‘service kilometers’. Total effective kilometers related to revenue earning kilometers actually operated by vehicle during any special occasions including casual contracts. The total kilometer covered by public service vehicle for earning revenue and other purpose is known as gross kilometers. It is the sum of the effective kilometers and dead kilometers.

Table-1 presents the details about volume of operation by the seven divisions of TNSTC, from 2000-01 to 2015-16. The average volume of operation was 3,307.84 lakh kms in 2000-01. It has increased to 4,387.18 lakh kms in 2009-10 and decreased and reached 4236.39 lakh kms in 2015-16.

In division-wise, in the initial period of study i.e. 2000-01 the highest volume of operation was achieved by Kumbakonam division with 5,848.47 lakh kms and followed by Madurai division with 4784.67 lakhs kms. Over the period of time the volume of operation has been increased in all seven divisions. The mean value of volume of operation was highest is Kumbakonam division (5191.42 lakh kms) and followed by Vilupuram division (5122.71 lakh kms). The lowest volume of operation was noticed in State Express Transport Corporation (SETC) (1978.96 lakh kms).

**Table-1**  
**Volume of Operation** (in lakh kms)

S. No	TNSTC Divisions Year	Coimbatore	Kumbakonam	Madurai	MTC	Salem	SETC	Vilupuram	Mean	AGR (%)
1	2000-01	3365.20	5848.47	4784.67	2314	1227.22	1664.98	3950.34	<b>3307.84</b>	-
2	2001-02	3257.58	4051.75	4786.21	2211	1187.95	1786.6	3946.37	<b>3032.49</b>	<b>-8.32</b>
3	2002-03	3370.57	4249.22	4983.27	2272	2378.30	1798.67	4054.96	<b>3301.00</b>	<b>8.85</b>
4	2003-04	3451.49	4310.56	5103.12	2251	2378.30	1889.83	4130.94	<b>3359.32</b>	<b>1.77</b>
5	2004-05	3484.24	4403.45	5140.40	2187	2517.24	1859.53	4314.28	<b>3415.16</b>	<b>1.66</b>
6	2005-06	3557.29	4441.00	5193.42	2176	2596.26	1856.84	4314.28	<b>3447.87</b>	<b>0.96</b>
7	2006-07	3688.78	4676.26	5357.92	2092	2788.17	1889.87	4503.14	<b>3570.88</b>	<b>3.57</b>
8	2007-08	4098.37	5306.30	5755.04	2344	3142.76	1994.46	5192.55	<b>3976.21</b>	<b>11.35</b>
9	2008-09	4279.08	5642.30	5979.36	2793	3363.69	2035.85	5626.67	<b>4245.71</b>	<b>6.78</b>
10	2009-10	4385.47	5794.56	6316.00	2958	3490.09	2035.70	5730.46	<b>4387.18</b>	<b>3.33</b>
11	2010-11	4481.49	5917.85	5414.66	3007	3550.87	2041.36	5896.25	<b>4329.93</b>	<b>-1.31</b>
12	2011-12	4563.01	5994.72	3850.62	3043	3588.25	1954.25	5915.30	<b>4129.88</b>	<b>-4.62</b>
13	2012-13	4560.40	6137.21	3878.88	3050	3688.48	2040.88	5879.00	<b>4176.41</b>	<b>1.13</b>
14	2013-14	4645.87	6200.65	3898.41	3210	3668.00	2253.38	6032.80	<b>4272.73</b>	<b>2.31</b>
15	2014-15	4588.33	6143.74	3829.96	3515	3712.74	2226.15	6037.99	<b>4293.37</b>	<b>0.48</b>
16	2015-16	4867.88	3944.63	4589.26	3535	3944.63	2335.03	6438.04	<b>4236.39</b>	<b>-1.33</b>
17	<b>Mean</b>	<b>4040.32</b>	<b>5191.42</b>	<b>4928.83</b>	<b>2684.87</b>	<b>2951.43</b>	<b>1978.96</b>	<b>5122.71</b>	<b>3842.65</b>	
18	<b>CGR (%)</b>	<b>2.93</b>	<b>1.65</b>	<b>-1.46</b>	<b>3.60</b>	<b>6.97</b>	<b>1.87</b>	<b>3.74</b>	<b>2.41</b>	

Source: CIRT, Pune.

The maximum growth rate of volume of operation was achieved by Salem division with 6.97 percent and followed by Vilupuram division and Metropolitan Transport Corporation Chennai (MTC) division 3.74 and 3.60 percents respectively. It was noticed that Madurai division has recorded de-growth rate of 1.46 percent. It is evident from the analysis that the divisions of SETC, Kumbakonam and Madurai have to be concentrated to increase the future growth of volume of operation.

### **Fleet Utilization**

Fleet utilization refers to the number of kilometers run per vehicle on road per day and it indicates the extent of the use of vehicle per day. Higher vehicle utilization distributes the fixed costs over a large number of kilometers thereby reducing the unit cost of operation which leads to better margins.

Table-2 indicates the fleet utilization by the seven divisions of TNSTC, from 2000-01 to 2015-16. From the beginning of the period Coimbatore division had the maximum fleet utilization (96.8 percent) followed by Kumbakonam division (94.2 percent), Salem division (93.8 percent) and Vilupuram division (93.2 percent). At the end of the study period Salem division had the highest fleet utilization (94.3 percent) followed by Vilupuram division (93.5 percent).

The average fleet utilization was 91.6 percent in 2000-01. It has increased to 93.80 percent in 2009-10 and decreased to 89.11 percent in 2015-16. The mean value of highest fleet utilization has been found i.e., 95.20 percent in Vilupuram division. Further all the 7 divisions except Metropolitan Transport Corporation division (83.92 percent) have recorded more than 90 percent of fleet utilization.

The highest growth rate of fleet utilization was registered by MTC division with 0.59 percent. Out of 7 divisions 4 divisions have registered positive growth rates and the remaining 3 divisions Madurai division (-0.01 percent) Kumbakonam division (-0.16 percent) Coimbatore division (-0.63 percent) have noticed negative growth rates. The overall growth rate of mean value of fleet utilization has registered in negative i.e., -0.01 percent. It is evident from the analysis that the divisions of Coimbatore, Kumbakonam and Madurai have concentrate to increase the growth of fleet utilization.

**Table-2**  
**Fleet Utilization** (in percentage)

S. No	TNSTC Divisions	Coimbatore	Kumbakonam	Madurai	MTC	Salem	SETC	Vilupuram	Mean	AGR (%)
	Year									
1	2000-01	96.8	94.2	92.8	82.1	93.8	90.8	93.2	<b>91.96</b>	-
2	2001-02	96.2	93.4	92.4	78.7	93.7	92.0	94.8	<b>91.60</b>	<b>-0.40</b>
3	2002-03	97.05	94.2	93.8	81.7	94.9	90.0	94.1	<b>92.25</b>	<b>0.71</b>
4	2003-04	97.5	92.9	93.1	81.2	94.9	88.7	94.3	<b>91.80</b>	<b>-0.49</b>
5	2004-05	97.1	98.1	94.1	85.4	95.8	88.2	95.9	<b>93.51</b>	<b>1.87</b>
6	2005-06	96.1	99.3	94.9	78.5	96.1	92.5	96.0	<b>93.34</b>	<b>-0.18</b>
7	2006-07	98.3	98.4	95.1	75.4	95.1	91.4	95.5	<b>92.74</b>	<b>-0.64</b>
8	2007-08	92.8	95.5	95.9	81.6	95.5	91.7	96.1	<b>92.73</b>	<b>-0.02</b>
9	2008-09	93.7	92.4	94.8	88.1	96.0	91.1	96.2	<b>93.19</b>	<b>0.49</b>
10	2009-10	93.5	95.7	96.1	92.1	91.6	91.6	96.0	<b>93.80</b>	<b>0.66</b>
11	2010-11	92.0	94.9	95.7	88.1	96.1	91.4	96.1	<b>93.47</b>	<b>-0.35</b>
12	2011-12	90.7	95.0	95.5	88.4	96.2	92.0	95.9	<b>93.39</b>	<b>-0.09</b>
13	2012-13	93.5	94.8	95.8	85.1	95.9	89.4	95.2	<b>92.81</b>	<b>-0.61</b>
14	2013-14	91.6	95.8	95.6	87.6	96.2	92.0	95.4	<b>93.46</b>	<b>0.69</b>
15	2014-15	87.3	96.4	94.6	84.2	96.4	91.7	95.0	<b>92.23</b>	<b>-1.32</b>
16	2015-16	89.4	86.2	86.7	84.5	94.3	89.1	93.5	<b>89.11</b>	<b>-3.38</b>
17	<b>Mean</b>	<b>93.97</b>	<b>94.83</b>	<b>94.19</b>	<b>83.92</b>	<b>95.16</b>	<b>90.85</b>	<b>95.20</b>	<b>92.59</b>	
18	<b>CGR (%)</b>	<b>-0.63</b>	<b>-0.16</b>	<b>-0.01</b>		<b>0.09</b>	<b>0.03</b>	<b>0.05</b>	<b>-0.01</b>	

Source: CIRT, Pune.

**Vehicle Utilization**

Vehicle utilization means that kilometers covered per vehicle on road per day. It is a measure of efficiency of both the Engineering and Traffic Departments. It indicates to what extent the vehicles available for operations are used. Usually vehicle utilization is expressed in relation to gross kilometers.

The details of vehicle utilization are shown in the Table-3. In the initial period (2000-01) the average vehicle utilization of all the seven divisions was 426 kms. It has increased to 487 kms (2010-11) and decreased to 482 kms in 2015-16. Among the seven divisions in 2000-01 the highest vehicle utilization (618kms) was found in State Express Transport Corporation division (SETC). The Metropolitan Transport Corporation (MTC) division had the least vehicle utilization i.e., 250 kms followed by Madurai division (379 kms) and Coimbatore division (410kms). Over the period of time the vehicle utilization has been increased in all seven divisions except SETC division.

**Table-3**  
**Vehicle Utilization** (in kms)

S. No	TNSTC Divisions Year	Coimbatore	Kumbakonam	Madurai	MTC	Salem	SETC	Vilupuram	Mean	AGR (%)
1	2000-01	410	450	379	250	438	618	437	426	-
2	2001-02	406	450	413	248	436	598	437	427	0.20
3	2002-03	423	445	423	250	436	608	445	424	1.43
4	2003-04	416	462	431	253	436	643	453	442	2.02
5	2004-05	420	466	428	261	448	652	437	444	0.59
6	2005-06	431	460	428	266	456	622	437	443	-0.32
7	2006-07	422	463	431	270	467	621	453	447	0.89
8	2007-08	436	488	417	280	479	625	490	459	2.74
9	2008-09	441	514	416	298	487	614	498	447	1.62
10	2009-10	433	517	427	308	488	611	505	470	0.72
11	2010-11	446	507	448	316	493	612	587	487	3.65
12	2011-12	398	482	424	315	497	605	507	461	-5.29
13	2012-13	432	482	444	309	500	600	505	468	1.35
14	2013-14	435	472	344	235	472	606	499	437	-6.43
15	2014-15	452	462	441	302	477	603	494	462	5.52
16	2015-16	448	531	447	299	529	608	512	482	4.43
17	<b>Mean</b>	<b>428</b>	<b>478</b>	<b>421</b>	<b>279</b>	<b>471</b>	<b>615</b>	<b>481</b>	<b>453</b>	
18	<b>CGR (%)</b>	<b>0.48</b>	<b>0.74</b>	<b>0.21</b>	<b>1.33</b>	<b>1.09</b>	<b>-0.22</b>	<b>1.35</b>	<b>0.65</b>	

Source: CIRT, Pune.

At the end of the study period SETC division had the largest vehicle utilization (608 kms) followed by Kumbakonam division (531 kms) and Salem division (529 kms). The mean value of vehicle utilization of all TNSTC divisions, the SETC division has the highest vehicle utilization with 615 kms followed by Vilupuram division (481 kms) and Kumbakonam division (478 kms) while MTC division has lowest with 288 kms.

The highest growth rate of vehicle utilization was found in the Vilupuram division with 1.35 percent followed by MTC division and Salem division 1.33 and 1.09 percents respectively. It was noticed that SETC division has noticed -0.22 percent growth rate followed by Madurai and Coimbatore divisions 0.21 and 0.48 percents respectively. It is evident from the analysis that the divisions of Kumbakonam, Coimbatore and Madurai have concentrate to improve the efficiency of engineering and traffic departments.

### **Number of Passengers Carried**

A 'passenger' means any person traveling in a public service vehicle other than the driver or the conductor or an employee of the permit holder while on duty. Total number of passengers should include all passengers carried at full fare or at concessional fares. A child passenger should be treated as one passenger for working out the total number of passengers carried. Average number of passengers carried per day is calculated by dividing the total number of passengers carried during the period by the number of days in the period.

The number of passengers carried daily by the each division of TNSTC from the period 2000-01 to 2015-16 is presented in Table-4. In 2000-01, MTC division has carried the maximum number of passengers i.e., 14431.94 lakhs followed by Madurai division (13755.77 lakhs), Kumbakonam division (11455.75 lakhs) and Vilupuram division (8816.87 lakhs). These divisions were also high number than the average number of TNSTC. The lowest number of passengers carried daily was noticed in State Express Transport Corporation (SETC) division i.e., 191.64 lakhs.

At the end of the study period, the number of passengers carried daily has increased in all seven divisions except Vilupuram and Kumbakonam divisions. In division-wise the MTC has recorded the maximum amount of mean value of number of passengers carried 16009.96 lakhs and the second position has occupied by Madurai with 14767.66 lakhs. MTC division has dominated during the entire study period in the number of passengers carried.

Recording the growth rate Coimbatore division has dominated the TNSTC with 5.58 percent and above the sectoral growth rate of 2.17 percent. Out of seven divisions, five divisions had registered positive growth rates and the remaining two divisions (Kumbakonam and SETC) have recorded negative growth rates. Even though MTC division had more number of passengers carried, the growth rate (3.02 percent) was less and below than Coimbatore division (5.58 percent). It is noticed from the analysis that TNSTC have been providing a large Transport Service facility to the public in Tamil Nadu.

**Table-4**  
**No. of Passengers Carried** (in lakh)

S. No	TNSTC Divisions Year	Coimbatore	Kumbakonam	Madurai	MTC	Salem	SETC	Vilupuram	Mean	AGR (%)
1	2000-01	3100	11445.75	13755.77	14431.94	3099.95	191.64	8816.87	<b>7834.55</b>	-
2	2001-02	2867	10306.33	12682.26	13113.86	2866.81	267.67	8236.61	<b>7191.48</b>	<b>-8.21</b>
3	2002-03	5442	9747.06	12076.45	12806.75	5442.06	262.39	7844.28	<b>7660.17</b>	<b>6.52</b>
4	2003-04	9895	9798.94	12642.54	12313.29	5452.06	312.46	8132.23	<b>8363.79</b>	<b>9.19</b>
5	2004-05	9890	9375.60	13566.73	13204.88	5519.18	327.56	8537.47	<b>8631.63</b>	<b>3.20</b>
6	2005-06	9847	9584.93	13804.82	13593.41	5717.67	335.24	8972.50	<b>8836.51</b>	<b>2.37</b>
7	2006-07	10290	10202.56	14386.81	13897.19	6007.96	330.56	9482.71	<b>9228.26</b>	<b>4.43</b>
8	2007-08	10754	10761.11	15125.64	14907.03	6219.05	300.95	9638.35	<b>9672.30</b>	<b>4.81</b>
9	2008-09	11302	11485.87	15278.90	17431.50	7083.20	290.28	9685.44	<b>10365.31</b>	<b>7.16</b>
10	2009-10	10882	11872.73	15604.50	18997.95	6679.76	277.99	10330.13	<b>10663.58</b>	<b>2.88</b>
11	2010-11	10656	11822.19	13181.15	20145.01	6966.16	269.56	10706.21	<b>10535.18</b>	<b>-1.20</b>
12	2011-12	9963	11528.32	17696.44	19768.99	6941.24	234.94	9717.67	<b>10835.80</b>	<b>2.85</b>
13	2012-13	9142	10616.56	16796.79	17544.35	5879.92	241.82	8618.84	<b>9834.33</b>	<b>-9.24</b>
14	2013-14	9023	10749.50	16713.47	18068.07	5664.64	270.05	8498.02	<b>9855.25</b>	<b>0.21</b>
15	2014-15	9015	10748.46	16563.54	18120.52	5582.28	270.52	8450.15	<b>9821.50</b>	<b>-0.34</b>
16	2015-16	9323	10895.61	16406.78	17814.63	5533.12	268.72	8420.00	<b>9808.84</b>	<b>-0.13</b>
17	<b>Mean</b>	<b>8836.93</b>	<b>10683.85</b>	<b>14767.66</b>	<b>16009.96</b>	<b>5665.94</b>	<b>278.27</b>	<b>9005.47</b>	<b>9321.15</b>	
18	<b>CGR (%)</b>	<b>5.58</b>	<b>-15.66</b>	<b>2.10</b>	<b>3.02</b>	<b>3.21</b>	<b>-0.11</b>	<b>0.46</b>	<b>2.17</b>	

Source: CIRT, Pune.

### Total Revenue

Income realized from transportation of passengers and incidental sources related to transportation of passengers constitutes traffic revenue. The sources of traffic revenue include, sale of passenger's tickets, accompanied luggage, reservation charges, causal contract services and postal mails carried. Income from sale of passenger tickets is the main source of traffic revenue. The income from other sources indicated above are incidental and related to actual conveyance of passengers. Since the income from the above source is directly related to actual conveyance or operations, it is also known as 'operating revenues'.

The total revenue earned by the seven divisions of TNSTC is presented in Table-5. In 2000-01 the average revenue earned by each division of TNSTC was Rs.397.65 lakh. As the period progress the average revenue each transport division has increased to Rs.738.75 lakh. It indicates that the good performance of transport divisions of TNSTC.



In a comparative analysis among the seven divisions in 2000-01 the maximum amount of total revenue was earned by Madurai division i.e. Rs.517.97 lakh and followed by Kumbakonam (Rs.516.34 lakh). The least amount was generated through transport service by State Express Transport Corporation (SETC) division i.e. Rs.202.37 lakh.

All the seven divisions of TNSTC have progressively increased their total revenue during the study period. Among the seven divisions the maximum amount of Rs.950.77 lakh average total revenue has earned by Kumbakonam division. Out of seven divisions five divisions have earned higher average total revenue than the sectoral average total revenue of Rs.738.75 lakh.

In the context of growth rate all the transport divisions except Madurai division (3.94 percent) have recorded positive as well as higher growth rate than the TNSTC (8.21 percent).

**Table-5**  
**Total Revenue** (Rs. in lakh)

S. No	TNSTC Divisions Year	Coimbatore	Kumbakonam	Madurai	MTC	Salem	SETC	Vilupuram	Mean	AGR (%)
1	2000-01	290.36	516.34	571.97	360.06	409.10	202.37	433.33	397.65	-
2	2001-02	293.68	526.72	601.72	387.23	423.18	195.91	492.80	417.32	4.9
3	2002-03	313.95	558.33	678.63	464.59	470.92	210.43	534.33	461.60	10.6
4	2003-04	326.22	591.53	715.95	435.00	511.09	218.23	564.54	480.37	4.1
5	2004-05	368.52	644.06	753.61	460.57	548.85	224.90	626.78	518.19	7.9
6	2005-06	395.02	666.06	786.41	473.73	572.80	256.74	669.22	545.72	5.3
7	2006-07	430.53	735.74	828.34	497.01	608.84	296.23	736.27	590.43	8.2
8	2007-08	477.38	812.06	893.64	588.02	656.34	304.65	827.00	651.30	10.3
9	2008-09	516.25	887.66	971.24	745.91	703.11	321.34	898.22	720.54	10.6
10	2009-10	541.45	930.86	1082.15	810.99	723.73	344.19	933.70	766.73	6.4
11	2010-11	569.71	983.02	970.11	920.20	790.94	344.80	994.91	796.24	3.8
12	2011-12	647.55	1122.06	808.34	1048.89	926.41	376.38	1153.95	869.09	9.1
13	2012-13	827.73	1467.32	994.63	1256.80	1146.23	509.43	1337.80	1077.14	23.9
14	2013-14	869.95	1592.08	1054.32	1360.53	1237.26	618.50	1437.19	1167.12	8.4
15	2014-15	907.42	1602.57	1069.22	1330.88	1217.36	654.35	1563.57	1192.20	2.1
16	2015-16	901.71	1575.91	1013.24	1304.81	1206.91	634.00	1542.12	1168.39	-2.0
17	Mean	542.34	950.77	862.09	777.83	759.57	357.03	921.61	738.75	
18	CGR (%)	8.87	8.83	3.94	10.44	8.22	8.88	9.18	8.21	

Source: CIRT, Pune.

### Revenue per Passenger Carried

Passenger kilometers or seat kilometers sold represent the volume of traffic in terms of seat kilometers actually occupied or booked. It is the sum total of the length of journeys performed by all the passengers carried. Passenger's kilometers are usually calculated from the sale of tickets of different denomination for different route lengths.

Table-6 envisages the revenue per passenger carried by TNSTC's divisions. By comparing the revenue per passengers among the seven divisions of TNSTC, State Express Transport Corporation (SETC) has earned the highest amount of Rs.105.60 per passenger in 2000-01. And this was the only division earned higher revenue per passenger than the sectoral average revenue per passenger of Rs.20.61.

**Table-6**  
**Revenue per Passenger Carried (Rs. in lakh)**

S. No	TNSTC Divisions Year	Coimbatore	Kumbakonam	Madurai	MTC	Salem	SETC	Vilupuram	Mean	AGR (%)
1	2000-01	9.37	4.51	4.16	2.49	13.20	105.60	4.91	20.61	-
2	2001-02	10.24	5.11	4.74	2.95	14.76	73.19	5.98	16.71	-18.90
3	2002-03	5.77	5.73	6	3.63	8.65	80.20	6.81	16.63	-0.49
4	2003-04	5.99	6.04	5.66	3.53	9.39	69.84	6.94	15.34	-7.75
5	2004-05	6.68	6.87	5.55	3.49	9.94	68.66	7.34	15.40	1.06
6	2005-06	6.91	6.95	5.70	3.49	10.02	76.59	7.46	16.73	7.91
7	2006-07	7.17	7.85	6.11	3.58	10.13	89.63	7.76	18.89	12.90
8	2007-08	7.68	7.96	6.21	3.94	10.55	101.23	8.58	20.88	10.53
9	2008-09	7.29	8.25	6.42	4.28	9.93	110.70	9.27	22.31	6.84
10	2009-10	8.11	8.10	7.08	4.27	10.83	123.82	9.04	24.46	9.68
11	2010-11	8.18	8.28	6.22	4.57	11.35	127.91	9.29	25.11	2.66
12	2011-12	9.33	9.49	6.13	5.31	13.35	160.20	11.87	30.81	22.68
13	2012-13	9.05	13.82	14.63	7.16	19.49	210.67	15.52	41.48	34.62
14	2013-14	9.64	14.81	15.70	7.53	21.84	229.03	16.91	45.07	8.65
15	2014-15	10.07	14.91	16.29	7.34	21.81	241.89	18.50	47.26	4.87
16	2015-16	9.67	14.46	15.82	7.32	21.81	235.94	18.32	46.19	-2.26
17	Mean	8.20	8.95	8.25	4.68	13.57	131.57	10.28	26.50	
18	CGR (%)	1.95	8.04	8.83	7.21	4.85	9.01	8.69	8.14	

Source: CIRT, Pune.

At the time increased the revenue per passenger earned by all the divisions of TNSTC. At the end of the study period that is 2015-16 the maximum amount of revenue per passenger (Rs.235.94) has achieved by SETC division. During the entire study period SETC division has been dominating with high revenue than other transport divisions. Further the same division has recorded the highest growth rate of 9.01 percent.

It is evident from the analysis that the highest value has been noticed in SETC division because SETC division buses are bush-back and deluxe coach and they are operated to cover long distance. The lowest revenue has been generated by Metropolitan Transport Corporation (MTC) division because it is carrying huge amount of population with concession in metropolitan city.

### **Manpower Productivity**

Manpower productivity is the ratio of the total staff employed to the number of buses in the fleet. Generally staff is provided for workshop and administration on the basis of the total fleet and for traffic on the basis of the number of schedules in operation. If the fleet utilization is low, the staff employed on workshop and administration trends to become high in relation to the number of schedules in operation. The efficiency in terms of staff-bus ratio can, therefore, be properly judged only when optimal utilisation of the fleet has been achieved. While evaluating the bus-staff ratio, the fleet utilisation should therefore be kept in view.

The details of manpower productivity among the seven divisions of TNSTC from 2000-01 to 2015-16 are shown in the table-7. All the divisions of TNSTC, except Metropolitan Transport Corporation (MTC) division (26.45 km) have recorded the manpower productivity more than 50 kms. The highest manpower productivity around 60 kms was achieved by SETC division in the year 2000-01.

As the time progressed the average man power productivity of TNSTC has increased from 51.88 kms to 71.53 kms. All the divisions of TNSTC, manpower productivity have reasonable by increased except MTC division. The average manpower productivity has achieved by all the divisions were more or less same. But the SETC division has possessed the highest manpower productivity of 76.18 kms and the lowest manpower productivity of 34.81 kms was noticed in MTC division.

From the analysis it is evident that all the divisions of TNSTC except MTC division have recorded sizable manpower productivity. It has been noticed for the low manpower productivity in MTC division because of high intensity of population and more private vehicle population in its operating area.

**Table-7**  
**Manpower Productivity** (in kms)

S. No	TNSTC Divisions	Coimbatore	Kumbakonam	Madurai	MTC	Salem	SETC	Vilupuram	Mean	AGR (%)
	Year									
1	2000-01	53.05	59.37	51.14	26.45	58.63	59.98	54.55	<b>51.88</b>	-
2	2001-02	52.15	58.54	53.5	26.45	57.36	59.98	55.39	<b>51.91</b>	<b>0.06</b>
3	2002-03	54.96	60.79	56.53	28.49	58.84	62.44	59.59	<b>54.52</b>	<b>5.03</b>
4	2003-04	55.45	63.11	58.03	29.61	60.7	66.74	59.17	<b>56.12</b>	<b>2.93</b>
5	2004-05	57.4	66.26	61.88	31.32	64.53	86.89	61.68	<b>61.42</b>	<b>9.46</b>
6	2005-06	59.82	67.56	62.04	32.62	67.66	71.07	64.65	<b>60.77</b>	<b>-1.06</b>
7	2006-07	62.41	70.56	65.57	32.23	73.37	74.4	69.25	<b>63.97</b>	<b>5.26</b>
8	2007-08	64.56	64.91	64.1	31.18	70.9	74.01	66.41	<b>62.30</b>	<b>-2.62</b>
9	2008-09	65.49	68.18	65.49	36.79	75.16	73.67	74.94	<b>65.67</b>	<b>5.42</b>
10	2009-10	66.33	69.32	66.71	39.66	74.37	77.48	66.06	<b>65.70</b>	<b>0.05</b>
11	2010-11	66.49	72.57	73.64	40.47	76.3	81.44	74.97	<b>69.41</b>	<b>5.64</b>
12	2011-12	68.45	76.61	72.55	43.32	79.2	83.23	76.14	<b>71.36</b>	<b>2.80</b>
13	2012-13	71.17	76.06	70.5	40.1	77.29	77.33	72.28	<b>69.25</b>	<b>-2.96</b>
14	2013-14	66.46	73.17	71.14	41.13	74.99	89.12	72.43	<b>69.78</b>	<b>0.77</b>
15	2014-15	66.3	72.5	69.6	38.2	75.0	87.2	73.3	<b>68.87</b>	<b>-1.30</b>
16	2015-16	70.1	71.1	74.8	38.9	70.1	93.9	81.8	<b>71.53</b>	<b>3.86</b>
17	<b>Mean</b>	<b>62.54</b>	<b>68.16</b>	<b>64.83</b>	<b>34.81</b>	<b>69.65</b>	<b>76.18</b>	<b>67.66</b>	<b>63.40</b>	
18	<b>CGR (%)</b>	<b>2.02</b>	<b>1.57</b>	<b>2.30</b>	<b>3.21</b>	<b>1.95</b>	<b>2.58</b>	<b>2.36</b>	<b>2.22</b>	

Source: CIRT, Pune.

### Revenue per Effective Kilometer

Revenue per Effective Kilometer is arrived at by dividing total revenue earned by STU with the total effective kms operated by buses. Cost per Effective Kilometer represents total expenditure divided by effective kilometer operated.

The total revenue earned per effective km by the seven divisions of TNSTC is presented in Table-8. In 2000-01 the average revenue earned per effective km by each division of TNSTC was Rs.13.82. As the period progressed the average revenue per effective km earned by each transport division has increased to Rs.19.14. It indicates that the good performance of transport divisions of TNSTC.

In a comparative analysis among the seven divisions in 2000-01 the maximum amount of total revenue per effective km was earned by Salem division (Rs.23.66) and followed by Metropolitan Transport Corporation (MTC) division i.e. Rs.17. The least amount was generated through transport service by Kumbakonam division i.e. Rs.8.83.

All the seven divisions of TNSTC have progressively increased their total revenue per effective km during the study period except Salem division. Among the seven divisions the maximum amount of total revenue per effective km has earned by MTC division i.e. Rs.26.99. Out of seven divisions MTC division has earned higher average total revenue per effective km than the sectoral average total revenue per effective km of Rs.19.14. In the context of growth rate all the transport divisions except Salem division (1.73 percent) have registered positive as well as higher growth rate than the TNSTC (4.99 percent).

**Table-8**  
**Revenue per Effective Kilometer** (in Rs.)

S. No	TNSTC Divisions	Coimbatore	Kumbakonam	Madurai	MTC	Salem	SETC	Vilupuram	Mean	AGR (%)
	Year									
1	2000-01	12.16	8.83	11.95	17.00	23.66	12.15	10.97	<b>13.82</b>	<b>0</b>
2	2001-02	12.99	13.00	12.57	19.37	24.72	10.97	12.49	<b>15.16</b>	<b>9.71</b>
3	2002-03	13.97	13.14	13.62	22.41	13.20	11.70	13.18	<b>14.46</b>	<b>-4.61</b>
4	2003-04	14.81	13.72	14.03	20.91	13.72	11.55	13.67	<b>14.63</b>	<b>1.18</b>
5	2004-05	15.75	14.63	14.66	22.09	14.64	12.09	14.53	<b>15.48</b>	<b>5.84</b>
6	2005-06	16.10	15.00	15.14	22.43	15.22	13.83	15.51	<b>16.18</b>	<b>4.47</b>
7	2006-07	16.51	15.73	15.46	24.11	15.44	15.67	16.35	<b>17.04</b>	<b>5.33</b>
8	2007-08	16.01	15.30	15.53	24.48	15.19	15.27	15.93	<b>16.82</b>	<b>-1.31</b>
9	2008-09	16.43	15.73	16.24	24.59	15.35	15.78	15.96	<b>17.15</b>	<b>2.01</b>
10	2009-10	16.50	16.06	17.13	24.36	15.51	16.91	16.29	<b>17.54</b>	<b>2.23</b>
11	2010-11	17.65	16.61	17.92	26.51	16.04	16.89	16.87	<b>18.36</b>	<b>4.67</b>
12	2011-12	20.30	18.72	20.99	29.87	18.05	19.26	19.51	<b>20.96</b>	<b>14.17</b>
13	2012-13	25.13	23.91	25.64	41.21	22.44	24.96	22.76	<b>26.58</b>	<b>1.24</b>
14	2013-14	26.63	25.68	27.05	37.79	23.72	27.45	23.82	<b>27.45</b>	<b>29.37</b>
15	2014-15	25.93	26.08	27.92	37.87	23.89	29.39	25.90	<b>28.14</b>	<b>2.52</b>
16	2015-16	24.79	24.71	25.27	36.91	22.86	27.15	23.95	<b>26.52</b>	<b>-5.76</b>
17	<b>Mean</b>	<b>18.23</b>	<b>17.30</b>	<b>18.20</b>	<b>26.99</b>	<b>18.35</b>	<b>17.56</b>	<b>17.36</b>	<b>19.14</b>	
18	<b>CGR (%)</b>	<b>5.09</b>	<b>5.93</b>	<b>5.79</b>	<b>5.31</b>	<b>1.73</b>	<b>6.95</b>	<b>5.25</b>	<b>4.99</b>	

Source: CIRT, Pune.

### **Costs per Effective Kilometers**

Like any other business, in bus operations also, profitability is a good indicator and it helps to assess the efficiency of a bus system. Efficiency is defined as providing quality service to public at the minimum cost of operation and earns nominal profit by the industry. Effective control of operation results in efficient services. Less bus staff ratio, high occupancy ratio, minimization of break downs, conservation of fuel, increased life of tire, improving services and routes, cost reduction and improvement of earnings are generally considered as good measures or indicators of the efficiency of the transport industry.

Despite the highly concentrated character of most local markets, the costs of tendered services of STU of Tamil Nadu and the effectiveness should, in principle, be assessed by comparing Revenue, Cost and Profit/Loss per effective km. Revenue Per Effective Kilometer is arrived at by dividing total revenue earned by STU with the total effective kms operated by buses. Cost per Effective Kilometer represents total expenditure divided by effective kilometer operated and Profit per Effective Kilometer would be generated by dividing total profit / loss to the Effective Kilometers Operated.

Table-9 explains the details about cost per effective km by the seven divisions of TNSTC from 2000-01 to 2015-16. The average cost per effective km was Rs.15.05 in 2000-01. It has increased to Rs.36.13 in 2014-15 and decreased to Rs.34.05 in 2015-16.

In division-wise in the initial period i.e. 2000-01 the minimum cost per effective km was achieved by Kumbakonam division with Rs.8.94 followed by Vilupuram division (Rs.12.22), Coimbatore division (Rs.12.99) and Madurai division (Rs.13.67). Over the period of time the cost per effective km has been increased in all seven divisions. The mean value of cost per effective km was lowest in Vilupuram division (Rs.19.08) followed by Kumbakonam division (Rs.19.19) and Salem division (Rs.20.66). The highest total cost per effective km was noticed in MTC division (Rs.30.77). All the divisions except MTC division have maintained the cost per effective kms.

The Salem division only has recorded the lowest growth rate of cost per effective km than the sectoral growth rate of 6.55 percent. A lowest growth rate was achieved by Salem division (3.70 percent). It is evident from the analysis that the Salem division has performed well in the management of cost per effective km.

**Table-9**  
**Cost per Effective Kilometers** (in Rs.)

S. No	TNSTC Divisions	Coimbatore	Kumbakonam	Madurai	MTC	Salem	SETC	Vilupuram	Mean	AGR (%)
	Year									
1	2000-01	12.99	8.94	13.67	19.19	23.89	14.47	12.22	<b>15.05</b>	-
2	2001-02	13.31	14.33	13.63	19.85	24.36	13.00	12.52	<b>15.86</b>	<b>5.34</b>
3	2002-03	14.29	12.86	14.03	20.59	13.10	13.43	13.04	<b>14.48</b>	<b>-8.70</b>
4	2003-04	14.61	13.26	14.12	21.32	13.64	12.60	13.51	<b>14.72</b>	<b>1.70</b>
5	2004-05	15.36	13.90	14.71	22.68	14.10	13.78	14.18	<b>15.53</b>	<b>5.48</b>
6	2005-06	17.75	15.98	16.97	26.48	16.48	15.28	16.27	<b>17.89</b>	<b>15.18</b>
7	2006-07	18.08	16.50	16.99	27.18	16.57	16.42	16.33	<b>18.30</b>	<b>2.28</b>
8	2007-08	17.85	16.08	17.27	27.65	16.34	18.03	15.92	<b>18.45</b>	<b>0.84</b>
9	2008-09	19.35	17.46	19.26	27.90	17.52	19.93	17.03	<b>19.78</b>	<b>7.21</b>
10	2009-10	19.73	17.59	19.77	27.29	17.71	21.86	17.44	<b>20.20</b>	<b>2.12</b>
11	2010-11	23.49	20.39	22.10	33.17	20.22	24.26	20.07	<b>23.39</b>	<b>15.78</b>
12	2011-12	26.90	23.10	25.51	36.98	23.46	27.76	23.38	<b>26.73</b>	<b>14.29</b>
13	2012-13	28.82	25.34	27.84	39.36	25.18	31.02	25.40	<b>28.99</b>	<b>8.48</b>
14	2013-14	31.24	28.09	29.81	42.53	28.10	33.04	27.79	<b>31.51</b>	<b>8.69</b>
15	2014-15	35.12	32.45	35.67	49.04	31.05	38.18	31.43	<b>36.13</b>	<b>14.66</b>
16	2015-16	33.05	30.80	32.11	51.04	28.78	33.88	28.69	<b>34.05</b>	<b>-5.77</b>
17	<b>Mean</b>	<b>21.37</b>	<b>19.19</b>	<b>20.84</b>	<b>30.77</b>	<b>20.66</b>	<b>21.68</b>	<b>19.08</b>	<b>21.90</b>	
18	<b>CGR (%)</b>	<b>7.16</b>	<b>7.42</b>	<b>6.91</b>	<b>6.76</b>	<b>3.70</b>	<b>8.10</b>	<b>6.62</b>	<b>6.55</b>	

Source: CIRT, Pune.

### Profit/Loss per Effective Kilometers

Profit/loss per effective kilometers is also termed as revenue generation as against expenditure or self-sufficiency. This parameter is assessed through two sub parameters viz., profit maximization/loss minimization and self-sufficiency. Profit maximization/loss minimization represents the aspect of performance that desires to maximize profit or minimize the deficit/loss. It is obtained by dividing revenues to cost. Self-sufficiency encompasses revenue not generated as a result of the fare-box specifically; the self-sufficiency assesses the public willingness to pay for a particular operator for providing service both directly in terms of fares paid and indirectly in terms of non-mandated local government contributions.

The profit/loss per effective km of the seven divisions of TNSTC are presented in Table-10. In 2000-01 the average loss per effective kilometer by each division of TNSTC was Rs.-1.23. It has increased to Rs.-7.99 in 2014-15 and decreased to Rs.-7.53 in 2015-16.

In division-wise in the initial period i.e. 2000-01 the minimum loss per effective km was found by Kumbakonam division with Rs.-0.11 followed by Salem division (Rs.-0.23) and Coimbatore division (Rs.-0.83). In spite of the study period Vilupuram division was in profit from 2002-03 to 2004-05, Kumbakonam division was in profit from 2001-02 to 2004-05, Salem division was in profit from 2003-04 to 2004-05, Coimbatore division was in profit from 2003-04 to 2004-05 and MTC division was in profit from 2002-03. In between 2006-07 to 2007-08 periods it showed increase in profits for Vilupuram division. The mean value of profit/loss per effective km was lowest in SETC division (Rs.-14.02) and other all divisions were higher than overall mean value of profit/loss per effective km.

**Table-10**  
**Profit /Loss per Effective Kilometers** (in Rs.)

S. No	TNSTC Divisions	Coimbatore	Kumbakonam	Madurai	MTC	Salem	SETC	Vilupuram	Mean	AGR (%)
	Year									
1	2000-01	-0.83	-0.11	-1.71	-2.19	-0.23	-2.32	-1.25	-1.23	0
2	2001-02	-0.32	-1.33	-1.06	-0.48	0.36	-2.03	-0.03	-0.70	-43.40
3	2002-03	-0.32	0.28	-0.41	1.82	0.1	-1.73	0.14	-0.02	-97.55
4	2003-04	0.2	0.46	-0.09	-0.41	0.08	-1.05	0.16	-0.09	441.67
5	2004-05	0.39	0.73	-0.05	-0.59	0.54	-1.69	0.35	-0.05	-50.77
6	2005-06	-1.65	-0.98	-1.83	-4.05	-1.26	-1.45	-0.76	-1.71	3643.75
7	2006-07	-1.57	-0.77	-1.53	-3.07	-1.13	-0.75	0.02	-1.26	-26.54
8	2007-08	-1.84	-0.78	-1.74	-3.17	-1.15	-2.76	0.01	-1.36	29.89
9	2008-09	-2.92	-1.73	-3.02	-3.31	-2.17	-4.15	-1.07	-2.62	60.72
10	2009-10	-3.23	-1.53	-2.64	-2.93	-2.2	-4.95	-1.15	-2.66	1.42
11	2010-11	-5.84	-3.78	-4.18	-6.66	-4.18	-7.37	-3.2	-5.03	89.00
12	2011-12	-6.6	-4.38	-4.52	-7.11	-5.41	-8.5	-3.87	-5.77	14.71
13	2012-13	-3.69	-1.43	-2.2	-35.68	-2.74	-6.06	-2.64	-7.78	34.79
14	2013-14	-4.61	-2.41	-2.76	-4.74	-4.38	-5.59	-3.97	-4.07	-47.72
15	2014-15	-9.19	-6.36	-7.75	-11.17	-7.16	-8.79	-5.53	-7.99	96.59
16	2015-16	-8.26	-6.09	-6.83	-14.13	-5.92	-6.73	-4.74	-7.53	-5.81
17	<b>Mean</b>	<b>-3.14</b>	<b>-1.89</b>	<b>-2.63</b>	<b>-6.12</b>	<b>-2.30</b>	<b>-4.12</b>	<b>-1.72</b>	<b>-3.13</b>	
18	<b>CGR (%)</b>	<b>-26.98</b>	<b>-22.25</b>	<b>-21.82</b>	<b>-22.76</b>	<b>-31.41</b>	<b>-14.02</b>	<b>-32.37</b>	<b>-20.75</b>	

Source: CIRT, Pune.



The State Express Transport Corporation (SETC) division only has recorded the lowest growth rate of profit/loss per effective km than the sectoral growth rate of -20.75 percent. Even though TNSTC was earning huge amount total revenue through transport service they were in carrying loss because of maintained cost, breakdown, personnel cost.

### Conclusion

From the analysis, all indicators of operational efficiency have showed better growth performances during the study period. The study of the profit/loss per effective km during the period shows that all divisions are in loss. The glaring situation of profit/loss per effective km over the years signifies the unsatisfactory financial position of STU of Tamil Nadu over the years of reference. The lower performance might be found to have bearings in this high incidence of over aged buses, the intensity of the problem could even lead to the necessary for taking radical measures like an extraordinary emphasis on creation of even a special fund for replacement of old buses etc.

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