

## **PERFORMANCE OF WEST BENGAL STATE BUS TRANSPORT CORPORATIONS: A SCALE AND COST ANALYSIS**

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**Partha Ghosh \***

### **Introduction**

The road transport corporations act, 1950 was enacted to offer an efficient and economical system of road transport service in the country<sup>1</sup>. Road transportation has appeared as the leading part in India's transport sector with a share of 4.7 percent in India's Gross Domestic Product (GDP) in 2009-10 which is higher than Railways by 1 percent share<sup>2</sup>. India is the second most populous nation in the world and the seventh largest country in South Asia by geographically extending over an area of 32.9 Lakh square kilometres<sup>3</sup>. To improve the living standard of the people road transport can adequately meet the growth of economic, social, health and cultural needs. Bus road transport is a cost-effective choice for the public for its efficient mobility in urban and rural areas. There are altogether 54 State Road Transport Undertakings (SRTUs) comprising 1,74,000 buses and carry about 7 crores of passengers per day<sup>4</sup>. Over the years, these Public transport undertakings face severe problems and become loss-making. The accumulated deficits incurred by the reporting SRTUs from Rs.1,470 crore in 2003-04<sup>5</sup> to Rs.11,350 crore in 2015-16<sup>6</sup>. The distress situation of the finances of SRTUs is reflected in the outcome of several factors which are overstaffing, fuel inefficiency, cost structure rigidity, high debt burden, and constrained autonomy in fare revision.

Financial Distress, which is mostly referred to as a financial failure, is a broad term and occurs when an organization's financial status moves towards bankruptcy. Difficulties in measuring financial distress often lead to an identification problem of whether an individual factor triggers financial stability. Owing to attain societal compulsion as the main priority of SRTUs, the government assists them by way of subsidies. The SRTUs of West Bengal are also affected by certain factors, as the accumulated losses of three major transport corporations exceed Rs.1,400 crore in the year 2008-09<sup>7</sup>. The accumulated losses of these transport undertakings have been an unbearable burden to the public exchequer. But it cannot continue to sponsor an ailing corporation on an annual basis. The Comptroller and Auditor General (CAG) suggest that these transport corporation's deficiencies were

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\* Assistant Professor, George College of Management Science ,(Affiliated to MAKA University of Technology, (West Bengal)

controllable with better management<sup>8</sup>. Therefore, the SRTUs required converting the loss-making schedules to at least break-even schedules for the longer survival. Hence, the study has to take a serious look at SRTUs from a financial dimension and attempts to investigate the Cost and Revenue perspective in the light of break-even analysis.

### **Literature Review**

Comprehensive literature of public transport corporations has been selected which describe different approaches and methods. It also appraises the contribution of different analyses as a technique to recognize the performance of SRTUs. The selected works of literature were organized to evaluate central concepts, methodologies and interpretations. Singh (2002) employed the Total Factor Productivity (TFP) approach to evaluate the Economic profitability of Municipal Transport undertakings in India. The changes in economic profitability, productivity and price recovery pattern across sample undertakings were examined. The price recovery index for sample undertakings was computed by comparing the output and input price index. The study showed most of the selected undertakings faced a decline in their productivity except Bangalore Metropolitan Transport Corporation. Mekoth and George (2005) present a case against subsidized future for the State Road Transport Undertakings. The study was limited to the political mediation in the pricing of transport services and its implication. The reasons for advocating subsidy are viewed from the standpoint of social welfare. The study help to reveal the truth that loss due to lack of efficiency cannot be considered as a social cost and SRTUs have a unique interventional role to play. Ramanayya and Nagadevara (2010) are aimed to answer the question on the efficiency of turnaround strategies implemented from 2006 by the Andhra Pradesh State Road Transport Corporation (APSRTC). The study attempts Data Envelopment Analysis (DEA) approach to identify the sub-units (depots) which are efficient and those which are inefficient. The DEA was carried out using the number of buses, quantity of oil, the quantity of lubricant and tyres as inputs in the model. The result indicates that the turnaround strategies continue to yield a surplus to the undertaking and the overall performance has also improved significantly. Basu and Ravichandran (2010) presented a management case towards the strategic transformation of Gujarat State Road Transport Corporation (GSRTC). The case study aims to detail a response of many folds, which is likely to be generalizing across parallel organizations. The frames of strategic transformation were elaborately discussed. The case studies identify four major obstructions of GRSTC's transformation. These were aggregates of economic prosperity, regulatory barriers, competition from private operators and internal disagreements. Vishnu and Kumar (2014) focused on the Performance Evaluation of Road Transport Corporations with the help of the Data Envelopment Analysis

(DEA) approach. A comparative study between SRTUs of three states such as Tamil Nadu State Road Transport Corporation (TNSRTC), Karnataka State Road Transport Corporation (KSRTC) and Kerala State Road Transport Corporation (KSRTC) were identified to contrast strengths and weaknesses. In the financial results, it was seen that fuel consumption per passenger kilometer of KSRTC was inefficient and staff ratio per schedule was also very high which results in the additional operating cost in comparison to others. Devi (2015) examined the use of the SWOT approach for the performance evaluation of Uttar Pradesh State Road Transport Corporation (UPSRTC). The concept of optimality of each alternative concerning each criterion such as strengths, weaknesses, opportunities and threats was performed. The evidence described political interference, fixed-route capacity, goal conflict and poor management were the general problems faced by the corporation. As per the study, there was a large gap between revenue earned and expenditure incurred. Patil(2017) focused on various problems of Maharashtra State Road Transport Corporation (MSRTC). Research objectives were to study physical performance which has an impact on financial performance. The study found that less vehicle utilization rate, low load factor, high staff-bus ratio, tax burden and struggle with the private operators negatively affected the financial performance of MSRTC. Katke and Laxman (2017) evaluated the financial performance of North Eastern Karnataka Road Transport Corporation (NEKRTC). An attempt had been made to analyze the performance based on major financial indicators. The study explained that NEKRTC was making its effect to identify new profitable route mapping without ignoring political interference. It has been stated that revenue earning is not a supreme objective of the NEKRTC but it has to bear all expenditure on its self earnings. Raghavendra and Devi (2018) studied cost and management practices in passenger road transport undertakings in the state of Karnataka. The analysis has been done based on three broad objectives in contrast to public and private sector undertakings. The study concludes that there was a significant difference in employee cost and materials cost among the two groups but no significant difference was found in the rest of the operating cost components. A performance evaluation of Kerala State Road Transport Corporation (KSRTC) through Data Envelop Analysis (DEA) was conducted by Jose and Akkara (2019). To achieve the goal of the study the model has been applied to assess depot-level performance. The study has discussed how DEA can be applied to evaluate the degree of efficiency at the depots level. One input and two outputs DEA model has been applied to evaluate 28 bus depots of KSRTC. The results showed Trivandrum City and Trivandrum Central are the depots that were working efficiently and Ernakulam was the most inefficient depot under study.

From the above study contexts, it can be said that the majority of the researches on

Transport undertakings are related to financial aspect and have been based on Southern and Northern part of the country. In the references of the articles, it has also been noticed that most of the researches were conducted on the financial performance of SRTU's without comparing the specific cost-revenue relationship. Considering the above facts the present study is undertaken to highlight the reality of the financial distress of West Bengal based road transport undertakings. The primary objective of the study is to investigate the financial deficiency of SRTUs in West Bengal. More specifically, the following objectives are formed:

To calculate the break-even margin of selected SRTUs and identify key cost elements responsible for inefficient performance.

1. To evaluate inter-relationship across selected SRTUs concerning break-even.

### **Materials and Method**

The study deals with the financial adversity of three SRTUs of West Bengal viz., CSTC, NBSTC and SBSTC. An exploratory research design was adopted considering the objective of the study. Exploratory research is mainly to have a better understanding and interpretation of the existing situation. Data from secondary sources cover a period of 16 years from 2001 to 2016 are collected along with the study preference. The annual and audit reports of Comptroller of Audit general in India, SRTUs profile and Performance published by Central Institute of Road Transport, Annual Report of Association of State Road Transport Undertakings are studied to collect financial data. Available data has been analysed to calculate the total variable cost, fixed cost, profit volume and break-even margin. Further ANOVA is used to test the significant relationship of break-even margin among selected SRTUs and draw meaningful conclusions. Given the second objective of the research, deficiency margin and its trend value have been drawn.

### **Break-even and Margin of safety**

The financial distress of any organization primarily denotes negative operating results which signify lesser revenue in comparison to cost. Break-even analysis represents a minimum acceptable output level where total revenue is equal to the total cost. It also reveals the interrelationship among cost, revenue and profit as it provides useful information for cost control and decision making. To fulfill the prime objective, break-even analysis is employed capturing the tight financial situation of SRTUs and specifies the degree of association of break-even margin across the selected transport undertaking over the years.

The following formulas are generally used to determine the break-even point:

Break-even Sales (in rupees) = Total Fixed Cost ÷ Profit volume ratio;

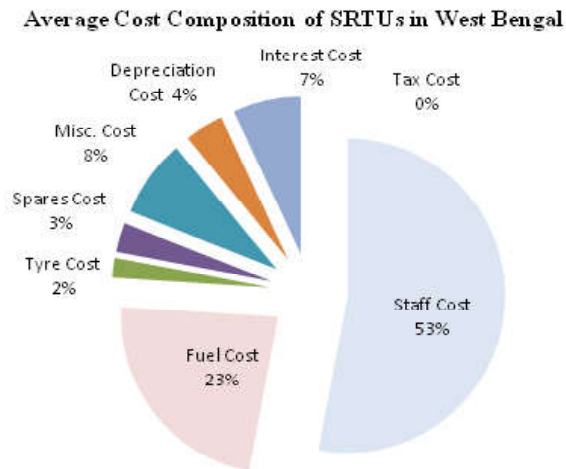
Where, Profit volume ratio = (Sales - Variable Cost) ÷ Sales

The profit volume (PV) ratio is one to analyze the profitability of a business. As at the break-even point, there is no profit and no loss since all fixed costs is recovered. The margin of safety is the situation when break-even sales are lesser than the actual sales. A high margin of safety is always favorable to the business.

Thus, Margin of safety = Total Sales - Sales at BEP and

Contrary, Margin of deficiency = Sales at BEP - Total Sales.

**Analysis and Discussion:**The total revenue of SRTUs has three components for instance traffic earnings, non-traffic earnings and subsidy. Non-traffic earnings include advertisement on buses, sale of scrap materials, rents from property etc. The total cost of SRTUs is classified into eight components as Employee cost, Fuel cost and Lubricant cost, cost of Tyres and Tubes, cost of Spares, Interest, Depreciation, Taxes and Miscellaneous cost.



Looking into the objective of Break-even margin, cost data have been organized into two categories, namely variable cost and fixed cost. Further, Employee cost, Depreciation, Interest and miscellaneous cost had been taken as a fixed category of cost whereas Fuel cost, Tyres cost, Spares and Tax had been considered as variables category of cost. The cost classification method and other techniques have been adopted as per CAG Audit Report No.4 (Commercial) on West Bengal for the year ended 31st March 2009, Annexure 10, and Page No.163-166.

**Table I** presents Contribution, Profit volume Ratio and Break-even Margin of CSTC during the year 2000-01 to 2015-16. This Table reveals that revenue, variable cost and fixed cost fixed costs varies greatly during the study period. Contribution, profit volume ratio and break-even revenue are obtained accordingly. Total revenue is considered not satisfactory

as it is less than break-even revenue in most of the years. As regards the comparison between the position relating to actual revenue and break-even revenue, CSTC is still very far.

**Table I. Calculation of Break-even Revenue of CSTC**

Table I. Calculation of Break-even Revenue of CSTC							
(i)	(ii)	(iii)	(iv)	(v) = (ii) – (iii)	(vi) = {(v)/(ii)} ×100	(vii) = (iv)/(vi)	(viii) = {(vii)-(ii)}
Year	Total Revenue (Rs. in Lakh) #	Total Variable Cost (Rs. in Lakh) ##	Total Fixed Cost (Rs. in Lakh) ###	Contribution (Rs. in Lakh)	Profit Volume Ratio (%)	Break Even Revenue (Rs. in Lakh)	Margin of Safety/(Deficiency) (Rs. in Lakh)
2000-01	14,126	3,929	9,317	10,197	72.19	12,907	1,219
2001-02	15,159	4,033	10,946	11,126	73.40	14,914	245
2002-03	15,511	4,434	10,922	11,077	71.41	15,294	217
2003-04	15,572	4,815	11,147	10,757	69.08	16,137	(565)
2004-05	15,182	4,940	10,869	10,242	67.46	16,111	(929)
2005-06	17,877	5,800	14,338	12,077	67.56	21,224	(3,347)
2006-07	18,820	6,118	13,005	12,702	67.49	19,269	(449)
2007-08	16,445	5,628	13,329	10,817	65.78	20,264	(3,819)
2008-09	20,422	5,296	13,720	15,126	74.07	18,524	1,898
2009-10	19,451	4,991	17,469	14,460	74.34	23,499	(4,048)
2010-11	21,493	4,913	20,230	16,580	77.14	26,225	(4,732)
2011-12	18,874	4,939	18,450	13,935	73.83	24,989	(6,115)
2012-13	22,177	5,267	16,587	16,910	76.25	21,753	424
2013-14	21,442	4,943	18,110	16,499	76.95	23,536	(2,094)
2014-15	30,737	11,648	31,588	19,089	62.10	50,863	(20,126)
2015-16	35,298	5,265	34,726	30,033	85.08	40,814	(5,516)

Source: Annual Report of SRTUs, Transport Research wings, MORTH, GOI, New Delhi.  
# Total revenue represents sale of tickets, non-traffic earnings and Government subsidies.  
## Total variable cost includes expenses relating to fuel, tyre, spares and taxes.  
### Total fixed cost includes expenses relating to employees, depreciation, interest and miscellaneous.

It is found that the PV ratio is highest i.e. 85.08% in the year 2015-16 and the lowest PV ratio is 62.10% in the year 2014-15. A high proportion of fixed cost signifies revenue should be in a high volume to earn enough gross profit to cover fixed costs but that has not been done. A negative figure represents a margin of deficiency. Since, out of 16 financial years under study the deficiency has seen 11 years which means revenues covers only variable cost but do not cover the fixed cost of operation completely. However, the deficiency level increased from a minimum of Rs.449 Lakhs during 2006-07 to Rs.21,126 Lakhs during 2014-15. Considerable changes of deficiency margin is registered which results in a substantial rise during the year 2003-04 to 2005-06, 2009-10 to 2011-12 and 2013-14 to 2014-15. The position relating to financial solvency is very much shocking as the deficiency

level gradually increasing almost year after year.

Table II presents Contribution, Profit volume Ratio and Break-even Margin of NBSTC during the year 2000-01 to 2015-16. This Table reveals that revenue, variable cost and fixed cost are increasing during the study period.

**Table II. Calculation of Break-even Revenue of NBSTC**

Table II. Calculation of Break-even Revenue of NBSTC							
(i)	(ii)	(iii)	(iv)	(v) = (ii) – (iii)	(vi) = {(v)/(ii)}× 100	(vii) = (iv)/(vi)	(viii) = {(vii)-(ii)}
Year	Total Revenue (Rs. in Lakh) #	Total Variable Cost (Rs. in Lakh) ##	Total Fixed Cost (Rs. in Lakh) ###	Contribution (Rs. in Lakh)	Profit Volume Ratio (%)	Break Even Revenue (Rs. in Lakh)	Margin of Safety/ (Deficiency) (Rs. in Lakh)
2000-01	8,185	2,888	7,660	5,297	64.72	11,836	(3,651)
2001-02	8,521	2,439	7,782	6,082	71.38	10,903	(2,382)
2002-03	8,587	2,825	7,613	5,762	67.10	11,346	(2,759)
2003-04	8,698	2,841	7,807	5,857	67.34	11,594	(2,896)
2004-05	9,251	2,824	8,024	6,427	69.47	11,550	(2,299)
2005-06	13,040	3,532	8,320	9,508	72.91	11,411	1,629
2006-07	12,403	3,829	8,906	8,574	69.13	12,883	(480)
2007-08	13,685	4,591	9,504	9,094	66.45	14,302	(617)
2008-09	13,727	5,239	9,539	8,488	61.83	15,427	(1,700)
2009-10	16,088	4,773	12,261	11,315	70.33	17,433	(1,345)
2010-11	16,053	5,063	15367	10,990	68.46	22,446	(6,393)
2011-12	15,678	4,828	13,235	10,850	69.21	19,124	(3,446)
2012-13	16,014	5,837	12,094	10,177	63.55	19,030	(3,016)
2013-14	17,328	6,533	12,340	10,795	62.30	19,808	(2,480)
2014-15	20,237	6,710	15,640	13,527	66.84	23,398	(3,161)
2015-16	24,313	8,783	17,523	15,530	63.88	27,433	(3,120)

Source: Annual Report of SRTUs, Transport Research wings, MORTH, GOI, New Delhi.  
 # Total revenue represents sale of tickets, non-traffic earnings and Government subsidies.  
 ## Total variable cost includes expenses relating to fuel, tyre, spares and taxes.  
 ### Total fixed cost includes expenses relating to employees, depreciation, interest and miscellaneous.

Total revenue is considered not satisfactory as it is less than break-even revenue almost all the years except 2005-06. The exception was due to a reasonable amount of grants and subsidies from the government. As regards the comparison between the position relating to actual revenue and Break-even revenue, NBSTC is still far away. It is found that the PV ratio is highest i.e. 72.91% in the year 2005-06 and the lowest PV ratio is 61.83% in the year 2008-09. Since, out of 16 financial years under study the deficiency has seen 15

years which means revenues cover only variable cost but do not cover the fixed cost of operation completely. However, the deficiency level increased from a minimum of Rs.480 Lakhs during 2006-07 to Rs. 6,393 Lakhs during 2010-11. Considerable changes of deficiency margin is registered which results in a significant rise and fall during the study period. The situation concerning financial solvency is terrible as the deficiency level continued.

**Table III** presents Contribution, Profit volume Ratio and Break-even Margin of SBSTC during the year 2000-01 to 2015-16.

Table III. Calculation of Break-even Revenue of SBSTC							
(i)	(ii)	(iii)	(iv)	(v) = (ii) – (iii)	(vi) = {(v)/(ii)} ×100	(vii) = (iv)/(vi)	(viii) = {(vii)-(ii)}
Year	Total Revenue (Rs. in Lakh) #	Total Variable Cost (Rs. in Lakh) ##	Total Fixed Cost (Rs. in Lakh) ###	Contribution (Rs. in Lakh)	Profit Volume Ratio (%)	Break Even Revenue (Rs. in Lakh)	Margin of Safety/ (Deficiency) (Rs. in Lakh)
2000-01	4,864	2,571	3,771	2,293	47.14	7,999	(3,135)
2001-02	5,272	2,570	4,233	2,702	51.25	8,259	(2,987)
2002-03	5,660	2,811	4,786	2,849	50.34	9,508	(3,848)
2003-04	5,880	2,991	4,701	2,889	49.13	9,568	(3,688)
2004-05	6,098	3,211	5,519	2,887	47.34	11,657	(5,559)
2005-06	7,576	3,632	5,742	3,944	52.06	11,030	(3,454)
2006-07	8,057	3,831	5,574	4,226	52.45	10,627	(2,570)
2007-08	8,098	3,753	6,349	4,345	53.66	11,833	(3,735)
2008-09	9,276	4,090	6,270	5,186	55.91	11,215	(1,939)
2009-10	11,813	5,093	8,482	6,720	56.89	14,910	(3,097)
2010-11	13,493	4,747	9,630	8,746	64.82	14,857	(1,364)
2011-12	12,496	5,091	10,362	7,405	59.26	17,486	(4,990)
2012-13	12,447	5,806	10,771	6,641	53.35	20,188	(7,741)
2013-14	14,136	6,181	11,497	7,955	56.27	20,430	(6,294)
2014-15	15,818	7,427	13,329	8,391	53.05	25,127	(9,309)
2015-16	17,054	7,788	13,357	9,266	54.33	24,583	(7,529)

Source: Annual Report of SRTUs, Transport Research wings, MORTH, GOI, New Delhi.  
# Total revenue represents sale of tickets, non-traffic earnings and Government subsidies.  
## Total variable cost includes expenses relating to fuel, tyre, spares and taxes.  
### Total fixed cost includes expenses relating to employees, depreciation, interest and miscellaneous.

This Table reveals that revenue, variable cost and fixed cost are increasing to a great extent during the study period. Total revenue is considered not satisfactory as it is less than break-even revenue throughout the study period. As regards the comparison between the position relating to actual revenue and break-even revenue, SBSTC is still struggling. It is found that the PV ratio is highest i.e. 64.82% in the year 2010-11 and the lowest PV ratio



is 47.14% in the year 2000-01. Since, the deficiency has seen all of the 16 financial years under study which means revenues cover only variable cost but do not cover the fixed cost of operation completely. However, the deficiency level increased from a minimum of Rs.1,364 Lakhs during 2010-11 to Rs. 9,309 Lakhs during 2014-15. Considerable changes of deficiency margin is registered which results in a significant rise and fall during the study period. The situation concerning financial solvency is dreadful as the deficiency level exists.

To judge the inter-relationship in terms of break-even results across CSTC, NBSTC and SBSTC inferential statistics such as single-factor ANOVA applied. The following hypothesis is framed and tested.

H0: There is no significant difference in Break-even Revenue between the SRTUs.

Table IV. Analysis of variances of Break-even Revenue						
Summary						
Groups	Count	Sum	Average	Variance		
CSTC	16	366323	22895.1875	98383068		
NBSTC	16	259924	16245.25	26647105		
SBSTC	16	229277	14329.8125	31623477		
ANOVA						
Source of Variation	SS	df	MS	F	p-value	F- Critical
Between Groups	646699832	2	323349916	6.192	0.004	3.204
Within Groups	2349804752	45	52217883			
Total	2996504584	47				
Source: Compiled by Author						

Source: Compiled by Author

Table IV shows that at the 5% level of significance, the calculated value of 'F' (6.192) is greater than the table value of 'F' (3.204) at 5% level of significance. Hence, there is a significant difference in break-even revenue across CSTC, NBSTC and SBSTC measured in the course of financial distress. Looking into the huge amount of financial instability, the volume of aggregated deficiency position over the years was depicted for the selected SRTUs as a whole.

### Concluding Remarks

The cost structure of the SRTUs had a high level of fixed costs, which significantly delayed break-even and caused financial distress. There is a need for a yardstick in the fixed cost structure that should be planned in alignment with the costs of operation. According to the analysis, manpower expenditure accounted for the maximum of fixed expenditure on average for selected SRTUs. However, to evaluate interrelationship in break-even performance, there was a significant difference found across selected SRTUs. Depreciation and miscellaneous costs share a marginal proportion of fixed costs that can be controlled. The interest amount is not controllable in the short term as it is dependent on loans from

financial institutions. Thus, the major cost savings may come from manpower. SRTUs should consider rationalizing manpower by instituting voluntary retirement plans and correcting the imbalance in the categories. According to the consequences, SRTUs must also keep fares reasonable. Moreover, it is also critical for SRTUs to utilize non-traffic revenue sources to cross-subsidize their operations in such a situation. To conclude, the sample SRTUs should understand that when their revenue will be sufficient to cover all of their fixed costs, execute policies accordingly.

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### **End Notes**

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