

3. Peer Group and Trend Analyses

Introduction

This technical memorandum presents a peer and trend analysis, comparing StarTran to similar systems. A description of the peer systems and the method for choosing peers are discussed in the following section. Data for the peer analyses herein were taken from the 2004 National Transit Database (NTD) summary reports for fixed route service, the last full year for which data on all the peer systems is available. The trend analysis, to determine how the performance of StarTran has changed over time versus changes in the peer group, compares 2004 data with the data from the 1999 NTD reports.

Peer Group Selection

In order to complete the peer review, a list of peers that are similar to Lincoln has been identified. Peers were defined as cities with similar service area population size/density and with large universities. It should be noted that every city and every agency have different organizational structures and different funding sources, characteristics which are excluded from this peer selection. Based on 2004 NTD data, Lincoln has a service area population of 235,594 and a service area population density of 2,873 people per square mile. The University of Nebraska-Lincoln has a student body of 21,792.

The search for peers began with a broad list of almost two dozen cities, including several of the peer cities identified in previous City of Lincoln projects. Cities that were of appropriate size, with populations between 100,000 and 300,000, but which had universities with fewer than 10,000 students were eliminated, which included Harrisburg, PA and Jackson, MS as examples. Cities whose universities operated a significantly large and separate transit program, such as in Lawrence, KA or Charlottesville, VA, were also excluded. Cities with populations less than 100,000 people and more than 300,000 people were eliminated. Cities without sprawling suburbs and extensive regional bus networks were also given preference; on this criterion, for example Raleigh, NC was excluded. This left a list of nine peer cities, listed below. Three of the peer cities are also state capitals. The final list of peer cities includes:

- Springfield, MO
- Tallahassee, FL
- Lexington, KY
- Lansing, MI
- Little Rock, AR
- Anchorage, AK
- Fargo, ND
- Wako, TX
- Lafayette, LA

The goal in creating a peer group is to develop one in which the peers individually share many commonalities with Lincoln, and which collectively have averages on key statistics regarding the operating environment – population, service area size, density – and on the level of service provided – particularly annual hours and miles of service provided, but also to the extent possible on peak vehicles. With the averages similar to Lincoln, the range within the group suggests boundaries for high and low achievement so that Lincoln’s performance can be compared not only to the peer average, but also placed within the continuum between these two extremes.

The peer group uses the NTD data to look at "hard facts" and ratios -- operating costs per trip or hour or mile, amount of service per capita or per square mile, revenue/cost, etc. It does not explicitly look at operating policies, management and organization, etc.; some of this is taken into account as background in selecting the group. Obviously the selection of a representative peer group can be biased and skew the data in either the positive or negative direction, which is why an exhaustive list is identified first, then whittled down using only service area and not performance statistics. The team worked with many permutations from a larger initial list of possible cities, sorting by the various factors, reviewing the averages of the groups in relation to Lincoln, and asking a list of commonsense questions to determine reasonableness -- does the peer group as a whole look like Lincoln? Do each of the individual systems generally resemble Lincoln? Are there others that should be included because they are so much like Lincoln? In the end, this group of nine was by far the best representative sample for the effort. Again, a peer group is not the same as a "best practices" review that looks for model systems to aspire to. It is basically a tool to examine how well StarTran/Lincoln does in comparison to a set of similar systems/cities, to identify where it does well or poorly, and to use these indicators as part of the total analytical package to identify issues and opportunities. It is descriptive, not prescriptive -- it identifies the symptoms but not the cures, which requires the data collected for other analyses.

Using the nine peers, the paper develops performance statistics (trips per hour, cost per mile, etc.) and more detailed level of service factors (span of service, days of operation, for example) for all of the systems and compares Lincoln’s service statistics to the averages and as they rank against the nine peers. Performance statistics were not taken into consideration when selecting the peers in order to maintain objectivity in the selection, basing it solely on the amount of service and service area size and density. Table 3-1 describes the overview characteristics taken into consideration when identifying peer cities.

Table 3-1: Overview Characteristics of Peer Cities

City	University	Service Area Population	Service Area Square Miles	Population Density	University Population
Lincoln, NE	University of Nebraska - Lincoln	235,594	82	2,873	21,792
Springfield, MO	Missouri State University	151,000	52	2,904	18,928
Tallahassee, FL	Florida State University	162,310	102	1,591	39,652
Lexington, KY	University of Kentucky	210,650	67	3,144	26,682
Lansing, MI	Michigan State University	282,030	136	2,074	45,166
Little Rock, AR	University of Arkansas at Little Rock	181,202	112	1,618	12,000
Anchorage, AK	University of Alaska Anchorage	218,145	77	2,833	17,512
Fargo, ND	North Dakota State University	105,539	45	2,345	12,099
Waco, TX	Baylor University	117,241	58	2,021	13,975
Lafayette, LA	University of Louisiana Lafayette	135,072	50	2,701	17,075
AVERAGE		173,688	78	2,359	22,565

Peer Group Analysis

This section compares StarTran’s 2004 operating performance to that of the peer systems. Table 3-2 presents an overview of both StarTran’s and the peer group’s service characteristics. Data presented on this table includes the service area population, operating statistics, and financial data from the 2004 NTD.

Table 3-2: Service Characteristics of Peer Systems

City	Service Area Population	Peak Vehicles	Revenue Hours	Revenue Miles	Ridership	Annual Operating Cost	Passenger Revenues
Lincoln, NE	235,594	50	109,569	1,417,951	1,508,073	\$6,274,661	\$1,256,606
Springfield, MO	151,000	19	72,189	1,021,769	1,398,391	\$4,248,867	\$478,392
Tallahassee, FL	162,310	49	129,064	1,720,087	4,459,371	\$9,474,976	\$3,061,915
Lexington, KY	210,650	38	131,524	1,508,586	3,846,412	\$8,458,038	\$1,233,722
Lansing, MI	282,030	85	219,890	2,976,901	8,278,214	\$20,637,906	\$2,442,804
Little Rock, AR	181,202	45	157,294	2,242,987	1,954,394	\$8,917,040	\$1,420,655
Anchorage, AK	218,145	46	146,240	2,100,375	3,536,059	\$15,826,686	\$2,663,894
Fargo, ND	105,539	12	39,680	540,123	736,108	\$1,919,146	\$283,932
Waco, TX	117,241	15	41,572	588,004	612,742	\$2,331,568	\$371,163
Lafayette, LA	135,072	13	40,534	535,931	1,156,396	\$2,441,977	\$254,202
AVERAGE	173,688	36	108,665	1,470,529	2,886,454	\$8,250,689	\$1,356,742

Performance Comparisons

Several indicators were used to assess the performance of StarTran in relation to other systems. These performance indicators measure and relate the three key factors in bus service delivery – input, output, and consumption – which are defined as follows:

- Service input statistics – Service input reflects the resources a system needs to produce a specific level of bus service. This analysis used system operating costs as the measure of service input.
- Service output statistics – Service output is the quantity of service produced by the system, including vehicle revenue hours, vehicle revenue miles, peak vehicles, and service span.
- Service consumption statistics – Service consumption measures the amount of service that the riding public uses. This analysis used unlinked passenger trips and farebox revenues to represent service consumption.

These statistics were used to generate a series of performance indicators measuring efficiency, effectiveness, and service availability.

- Financial efficiency measures the cost to produce a unit of service. This analysis used two indicators of financial efficiency – cost per mile, and cost per hour.

- Service effectiveness measures the amount of service consumed per unit of service provided. This analysis used two indicators of service effectiveness – passengers per mile, and passengers per hour.
- Cost effectiveness links the previous two measures by assessing how well resources are used to produce trips and how well fare revenue covers the cost of those trips. This analysis used two indicators of cost effectiveness – cost per passenger and farebox recovery.
- Level of service measures the amount of service provided for the service area population. This analysis used four indicators of service availability – miles per capita, hours per capita, peak vehicles per 10,000 people, and passengers per capita.

The findings are presented in a standard format, as illustrated in Table 3-3.

Table 3-3: Reporting Format

Peer group performance	Best value
	Worst value
	Average value
StarTran performance	Value
	Percent difference from peer group average
	Rank within group (where “1” is always best)

Financial Efficiency

Financial efficiency measures the cost to produce a unit of service. This analysis used two indicators of financial efficiency: cost per mile and cost per hour. These indicators present the total cost to provide the service divided by specific unit of service and are depicted for the peer group in Table 3-4.

Table 3-4: Financial Efficiency

Statistic	Cost per Revenue Mile	Cost per Revenue Hour
Lowest	\$3.55	\$48.37
Highest	\$7.54	\$108.22
Average	\$5.09	\$68.89
StarTran	\$4.43	\$57.27
Percent Difference	-15.0%	-20.3%
Rank (of 10)	5	4

Generally, StarTran is in the mid- range of the peer group on both factors. StarTran performs about 15 percent better than peer average in cost per mile, and 20 percent better in cost per hour. This performance placed StarTran fifth of ten in the peer group for cost per mile and fourth of ten in the peer group for cost per hour.

Overall, StarTran is financially efficient, spending its resources well in terms of producing service on the street, as measured in the number of miles and hours provided. Within the group, though it is in the middle, it should be noted that its performance is closer to the top than bottom, e.g. less than \$ 1.00 more per mile than the best system, and over \$ 3.00 less than the worst

system. The same holds true for the cost per hour --- about \$ 9.00 more than the best system, but \$ 50.00 less than the worst.

Service Effectiveness

Service effectiveness measures the amount of service that is consumed per unit of service that is provided. The service effectiveness measures include passengers per mile and passengers per hour, and are presented in Table 3-5.

Table 3-5: Service Effectiveness

Statistic	Passengers per Revenue Mile	Passengers per Revenue Hour
Lowest	0.87	12.43
Highest	2.78	37.65
Average	1.82	24.36
StarTran	1.06	13.76
Percent Difference	-71.4%	-77.0%
Rank (of 10)*	8	9

StarTran lags far below the averages in terms of service effectiveness compared to the peer group, ranking eighth in passengers per mile, and ninth in passengers per hour. StarTran performs 71% worse than the peer group average in passengers per mile and 77% worse than the average in passengers per hour.

These indicators suggest that while StarTran is effective in putting out service, the service it is putting out is not being consumed at rates comparable to its peers. (Even taking into account the service provided by the UNL system and its ridership, the team found that the numbers only increased marginally, with StarTran still lagging behind on these measures. UNL numbers are excluded from this analysis and are only mentioned as an aside. NTD data for all 10 cities do not include such statistics, so other cities might similarly be affected, which is why the peer analysis is solely based on NTD reporting, and why the peer selection was made keeping the nature of the university programs in mind).

As noted in the introduction, the numbers in the peer analysis are descriptive and not prescriptive; that is, the numbers suggest that significant attention needs to be paid to the issue of ridership productivity, but do not suggest specifically where the attention should be placed, which will come from other project activities – on/off counts, route diagnostics, public outreach, etc.

What the numbers do suggest, however, is that attention has to be paid to how the service is provided, how effective it is in meeting the community’s needs, and how services can be adjusted to improve ridership productivity.

Cost Effectiveness

Cost effectiveness measures tie the two previous sets of measures together, looking at how well resources are utilized to produce trips, and how much of the cost of those trips is being covered by fare revenue. There are three key indicators for cost effectiveness -- cost per passenger, revenue per passenger, and farebox recovery (revenue/cost ratio). Table 3-6 presents the cost effectiveness indicators.

Table 3-6: Cost Effectiveness

Statistic	Cost per Passenger Trip	Farebox Recovery	Revenue per Passenger
Lowest	\$2.11	10.4%	\$0.22
Highest	\$4.56	32.3%	\$0.75
Average	\$3.05	16.0%	\$0.48
StarTran	\$4.16	20.0%	\$0.83
Percent Difference	26.8%	20.2%	42.2%
Rank (of 10)*	8	2	1

Cost per passenger is the ratio of the total cost to provide StarTran service to the number of passengers carried. As the previous sections have indicated, StarTran is highly effective in terms of its resource utilization to produce miles and hours of service, but less so in converting those resources into trips. Thus, StarTran performs poorly in terms of cost per passenger, eighth out of ten in the group. StarTran’s cost per trip is 27% higher than the peer group average.

Interestingly, despite its poor performance regarding cost per trip, owing largely to productivity and not to resource expenditures, StarTran ranks very highly on farebox recovery, which is an outgrowth of its number one performance on revenue per passenger. StarTran receives \$ 0.83 per passenger trip, 42 percent higher than the peer average of \$ 0.48, which compensates a great deal for its low ridership productivity.

Because the farebox ratio is guided not only by the number of passengers carried and operating costs for the system, but by policy determinations made locally regarding fare policy – e.g., the base fare level, the types and percent discounts given, etc. -- StarTran performs well in farebox recovery – second out of ten in the group. In fact, StarTran performs 20% better than the average of the peer groups in recovering costs with passenger fares, recovering 20% of their costs from fares.

Clearly, StarTran has been able to use its higher than average revenues to offset its low ridership productivity. *(Note: As part of the other analyses which will go into this study, the team will analyze the impact of the “Ride for \$ 5” program on these statistics for 2005).*

Level of Service

Level of service measures document the amount of service provided in relation to the service area population. These analyses use several indicators of service availability – miles per capita, hours per capita, passengers per capita, and service span comparisons.

Service Provided per Capita

In terms of service provided per capita, StarTran’s fixed route service ranks only 7th of 10 systems on both measures in Table 3-7, fully 31 percent less than the average of the group on a per mile basis and 25 percent less on a per capita basis. These indicators suggest that StarTran may be undersized in relation to the area population, which in turn could be contributing to its lower than average productivity measures; effectively, StarTran may be spreading its limited resources too thinly in the community, reducing the system’s effectiveness to potential riders. Again, the numbers are descriptive, but suggest these types of analyses are needed for the project.

Table 3-7: Service Provided per Capita

Statistic	Revenue Miles per Capita	Revenue Hours per Capita
Lowest	3.97	0.30
Highest	12.38	0.87
Average	7.91	0.58
StarTran	6.02	0.47
Percent Difference	-31.4%	-25.3%
Rank (of 10)*	7	7

Service Span

Service span refers to the number of hours that revenue service operates, and is also a measure of level of service and utility to the community. Clearly, systems that provide more hours on a daily basis offer services that may be beyond those offered by StarTran – evening services on weekdays, longer Saturday hours, or Sunday service. The peer service span data is presented on Table 3-8 for weekday, Saturday, and Sunday.

Table 3-8: Service Span Comparison

Statistic	Weekday Span	Saturday Span	Sunday Span
Lowest	12.0	9.0	0.0
Highest	20.5	20.0	16.0
Average	16.7	14.7	7.6
StarTran	14.0	13.0	0.0
Percent Difference	-19.4%	-12.8%	N/A
Rank (of 10)*	8	7	7

* Wider span is better

StarTran ranks low for all three periods – weekdays, Saturdays, and Sundays -- in terms of service span compared to the peer group. StarTran’s weekday service span is eighth out of ten and its Saturday service span is ranked seventh out of ten. StarTran does not operate Sunday service, but six out of the ten peer systems do. StarTran operates 19% fewer weekday hours than the peer group average and 13% fewer Saturday hours.

Again, while the data are descriptive, they suggest that the span of service for StarTran should be addressed when considering changes that could increase the utility of the system within the community.

Conclusion

StarTran performs well in terms of its financial efficiency, e.g. its use of resources to create miles and hours of service, but less well when it comes to the utilization of the service effectiveness as measured by passenger trips per mile or hour. The system does accrue significantly higher than average revenues per passenger to offset the low ridership, producing a better than average farebox recovery rate than its peers.

Overall, the data suggest that it is the allocation of the resources and not the production of service that is critical to improving the StarTran program. This suggests a great deal of focus on where the routes operate, how they operate, and when they operate, which in turn links to some of the concerns already expressed during public sessions regarding where and when the service is operating, the directness of the network, and other factors related to the utility of the program to the community.

Trend Analysis

The trend analysis indicators are presented in Table 3-9, comparing data from the 1999 and 2004 National Transit Database reports. Five sets of data provide a comparison of how StarTran has performed over time compared to its peers. The data sets include the service baseline, financial efficiency, service effectiveness, cost effectiveness, and amount and use of service.

Table 3-9: 1999-2004 Trend Statistics

Statistic	Percent Change (1999 to 2004)			
	StarTran		Peers	
	Total	Annual	Total	Annual
<i>Service Baseline</i>				
Ridership	-5.7%	-0.9%	15.1%	2.5%
Farebox Revenue	21.1%	3.5%	31.9%	5.3%
Operating Expense	24.7%	4.1%	44.0%	7.3%
Revenue Hours	12.0%	2.0%	12.1%	2.0%
Revenue Miles	8.6%	1.4%	11.4%	1.9%
Peak Vehicles	4.2%	0.7%	12.6%	2.1%
Service Area Population	11.4%	1.9%	7.7%	1.3%
<i>Financial Efficiency</i>				
Cost per Revenue Mile	14.8%	2.5%	26.5%	4.4%
Cost per Revenue Hour	11.3%	1.9%	25.7%	4.3%
Cost per Peak Vehicle	19.7%	3.3%	26.3%	4.4%
<i>Service Effectiveness</i>				
Passengers per Revenue Mile	-15.8%	-2.6%	-0.6%	-0.1%
Passengers per Revenue Hour	-9.4%	-1.6%	-0.8%	-0.1%
Passengers per Peak Vehicle	32.2%	5.4%	-2.3%	-0.4%
<i>Cost Effectiveness</i>				
Cost per Passenger Trip	32.2%	5.4%	28.6%	4.8%
Farebox Recovery	-2.9%	-0.5%	-6.3%	-1.1%
Revenue per Passenger Trip	28.4%	4.7%	36.1%	6.0%
<i>Amount and Use of Service</i>				
Revenue Hours per Capita	0.6%	0.1%	-1.3%	-0.2%
Passengers per Capita	-15.3%	-2.6%	1.4%	0.2%

Service Baseline

The service baseline includes the basic data upon which the groups were selected and measured, using ratios derived from the information. A number of trends are immediately evident in the baseline data set:

- StarTran’s ridership dropped by 6% over the period while the peer group averaged a 15% increase in ridership
- Operating expenses at StarTran increased by only 25% while the peer group averaged 44% growth in expenses

- StarTran's peak vehicles increased by 4% over the period where the peer group averaged an increase of 13%
- StarTran's service area population grew at a faster rate (11%) than the average of the peers (8%)

As a whole, the period was good for StarTran service with the exception of the small annual loss of ridership. Other than in ridership, it generally performed similarly or better than the peer group average.

Financial Efficiency

Overall, StarTran's cost per mile, hour and peak vehicle increased from 1999-2004 at a far lower rate than for the peer group, so StarTran performed better than average over the period in controlling its costs.

Service Effectiveness

The service effectiveness indicators refer to the amount of passengers per unit of service provided. In terms of passengers per mile and passengers per hour, StarTran declined over the period by 16% and 9%, respectively. The peer group average declined in passengers per mile and hour as well over the period, but at a much slower rate (0.6% and 0.8%, respectively). Thus, StarTran's service effectiveness change in comparison to the peers was well below the average.

Cost Effectiveness

StarTran experienced a large increase in cost per passenger trip from 1999 to 2004 (32%), but the peer group average cost per passenger trip also increased at almost the same rate (29%). The difference is that StarTran's rate went up because ridership went down but costs were controlled, while the peer group change was largely based on higher cost increases than those experienced by StarTran, and fairly stable ridership changes. Farebox recovery declined for both StarTran and the peer group, but less for StarTran. With fare increases across the board, the revenues per passenger trip increased over the period for both StarTran (28%) and the peer group (36%).

Amount and Use of Service

From 1999-2004, StarTran increased its amount of service by 0.6% (revenue hours per capita), about the same as for the peer group, which actually saw a reduction in their service by an average of 1%. On the other hand, StarTran lost passengers per capita at a rate of 15% for the period while the peer group increased their passengers per capita by 1% for the period.

Conclusion

The trend from 1999-2004 for StarTran and its peers are not terribly dissimilar except that StarTran achieved much of its performance by managing costs better than its peers while seeing a larger than average drop in riders. This appears to be the theme for the entire analysis in this report – StarTran management and operations are run cost effectively but with limited resources

in comparison to its peers. These limited resources and the manner in which they are provided need to be the focus for the project, to determine how best to allocate hours and miles of service to stem ridership losses, to create new and improved services, and increase the utility of the system for the entire community.