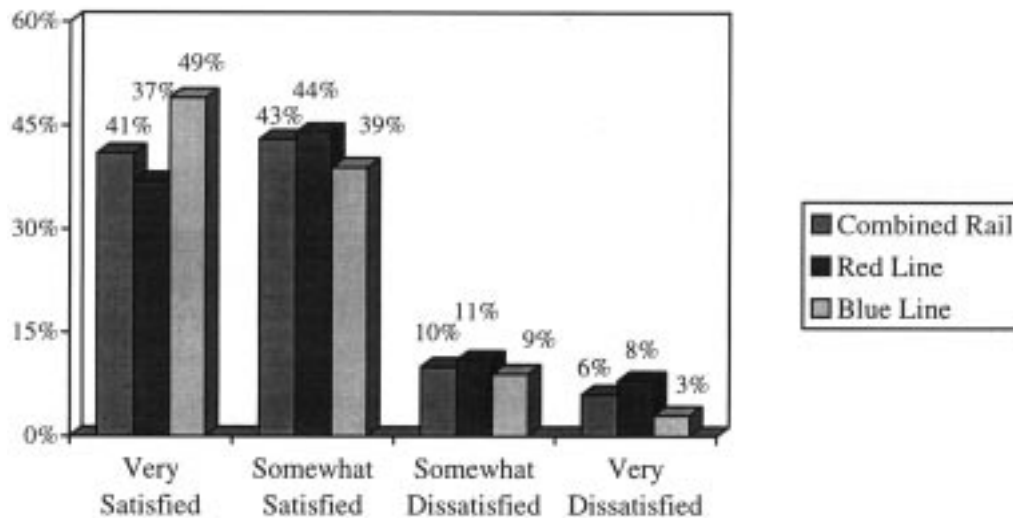


8K. *Market Segmentation of CTA Rail Customer Satisfaction Findings*

The overall satisfaction ratings of CTA customers are shown in Chart 8.12 below. Overall, for combined rail customers 41% report being very satisfied with CTA service, and 43% are somewhat satisfied. Only 6% report being very dissatisfied and 10% somewhat dissatisfied. Blue Line customers are slightly more satisfied than are Red Line customers.

Chart 8.12
CTA Customer Overall Satisfaction with Service



As discussed in Chapter 4, customer loyalty is as important as customer satisfaction. It is important to determine, on the basis of key responses, which customers are secure in their use of public transit, which are favorable towards it, which are vulnerable to no longer using transit, and which are at risk of shifting to other forms of transportation.

A secure customer is one who says that he or she is:

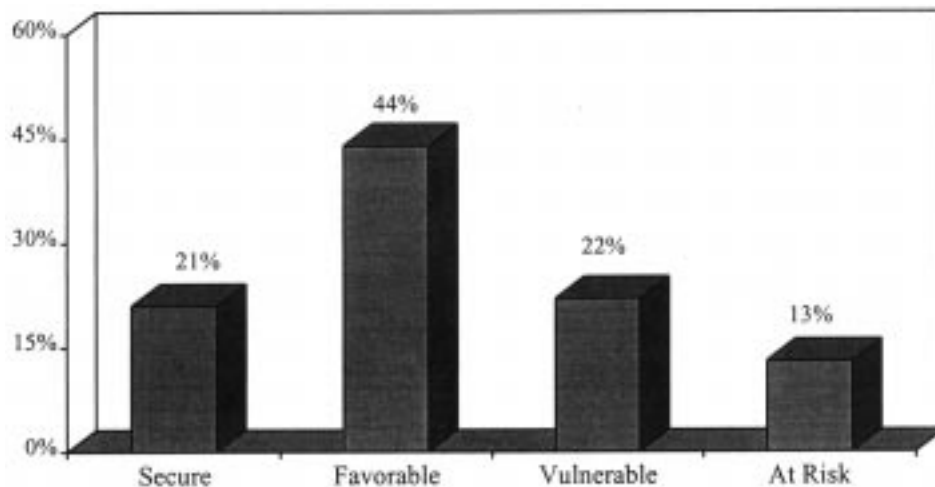
- very satisfied with the service
- definitely will continue to use the service in the future
- definitely would recommend the service to others

A vulnerable customers is one who says he or she is:

- somewhat satisfied or dissatisfied
- might or might not use the service in the future
- might or might not recommend the service to others

Among CTA Rail customers, 21% can be classified as secure customers, 44% as favorable, 22% as vulnerable customers, and 13% at risk of becoming non-customers (See Chart 8.13 below.)

Chart 8.13
Customer Loyalty Segments Among Combined CTA Rail Customers



Customer loyalty indices for public transportation are complicated by the issue of transit dependent customers. While only 22% of secure customers say they use transit because they do not have a car available or because they do not drive, 41% of combined vulnerable and at risk customers are in the transit dependent category. Those who prefer to take the train whether than driving are more likely to be committed to CTA use than those who use public transit because they must.

Vulnerable and at risk customers are more likely to take a bus to the station where they board and are more likely to make transfers. There are no statistically significant differences between secure and vulnerable/at risk customers by income, age, employment, or trip purpose. By gender, 58% of secure customers are female as compared with 69% of vulnerable/at risk customers.

Twenty-three percent of vulnerable/at risk customers are either somewhat or very dissatisfied with CTA service; 24% say they probably or definitely will not continue to use public transit in the future if another means of transportation becomes available to them. Nineteen percent say they would probably or definitely not recommend use of CTA to a family member, friend, or co-worker.

Also important to market segmentation analysis is the ability to look at the ordering of service attributes by different segments of the market since we know not all customers are affected the same by all service quality elements. One of the greatest advantages of the impact score approach is that impact scores can be easily calculated and ordered by market segment, as for example, by secure and vulnerable/at risk customers as shown for combined CTA Rail in Table 8.14. As shown in Chart 8.13, secure customers represent 21% of the market while vulnerable/at risk customers account for 35% of the combined CTA Rail market.

"Cleanliness of the train interiors, seats, and windows" and "cleanliness of station stops" are significantly more important to secure customers, while "cost effectiveness, affordability, and value" is significantly less important. "Short wait time for transfers" is significantly more important to vulnerable/at risk customers. Less important to these customers are environmental factors, including: "absence of offensive odors", "cleanliness of train interiors", and "freedom from the nuisance behaviors of others" — all attributes within the top ten in importance to secure customers.

Such segmentation of impact scores can be easily calculated for other market segments such as transit-dependent vs. non-transit dependent riders, or by geographic area, trip purpose, or primary destination.

Table 8.14 Computation of Impact Scores - Combined CTA Rail Customer Loyalty Segments Attribute (<i>N</i> =602)		Mean Overall Sat. w/ Problem	Mean Overall Sat. w/o Problem	Gap Value	Percent Who Had Problem	Impact Score	Rank
Secure Customers							
1	Trains that are not overcrowded	7.36235	8.13308	0.771	0.686	0.529	1
2	Reliable trains that come on schedule	7.07696	7.99432	0.917	0.427	0.392	2
3	Frequent service so that wait times are short	7.03512	7.96817	0.933	0.392	0.366	2
4	Cleanliness of the train interior	7.16515	7.96710	0.802	0.454	0.364	2 +
5	Availability of seats on the train	7.32644	7.94828	0.622	0.555	0.345	3
6	Smoothness of the ride and stops	7.05570	7.91527	0.860	0.366	0.315	4
7	Frequency of delays for repairs/emergencies	7.06786	7.89124	0.823	0.379	0.312	4
8	Explanations and announcement of delays	7.21379	7.89039	0.677	0.416	0.281	4
9	Freedom from the nuisance behaviors of others	7.26699	7.88058	0.614	0.453	0.278	4
10	Absence of offensive odors	7.30930	7.88659	0.577	0.478	0.276	4
11	Cleanliness of stations	6.99347	7.86992	0.876	0.304	0.266	4 +
12	Temperature on the train	7.14546	7.85302	0.708	0.353	0.250	5
13	Friendly, courteous, and quick service	6.68744	7.78390	1.096	0.175	0.192	5
14	Clear and timely announcements of stops	7.08625	7.79377	0.708	0.262	0.185	6
15	Cost effectiveness, affordability, and value	6.38235	7.78757	1.405	0.129	0.181	6 -
16	Ease of paying fare, purchasing tokens	7.19884	7.78630	0.587	0.307	0.180	6
17	Short wait time for transfers	7.19579	7.77486	0.579	0.287	0.166	6
18	Fairness/consistency of fare structure	6.72123	7.82275	1.102	0.138	0.152	6
19	Transit personnel who know the system	6.16158	7.78456	1.623	0.093	0.151	6
20	Comfort of seats on the train	6.61636	7.72501	1.109	0.111	0.123	7
Vulnerable Customers							
1	Cost effectiveness, affordability, and value	3.62760	5.81638	2.189	0.504	1.103	1
2	Reliable trains that come on schedule	4.44817	6.04795	1.600	0.671	1.073	1
3	Availability of seats on the train	4.49564	5.87758	1.382	0.679	0.938	2
4	Frequency of delays for repairs/emergencies	3.97006	5.48472	1.515	0.588	0.891	3
5	Trains that are not overcrowded	4.73048	5.83770	1.107	0.797	0.882	3
6	Short wait time for transfers	3.91538	5.81547	1.900	0.447	0.849	4 +
7	Frequent service so that wait times are short	4.44978	5.77330	1.324	0.630	0.834	4
8	Transit personnel who know the system	3.40172	5.53745	2.136	0.370	0.790	5
9	Fairness/consistency of fare structure	3.70728	5.50804	1.801	0.419	0.755	6
10	Explanations and announcement of delays	4.49426	5.65520	1.161	0.638	0.741	6
11	Smoothness of the ride and stops	4.36636	5.56162	1.195	0.521	0.623	7
12	Comfort of seats on the train	3.41746	5.26958	1.852	0.324	0.600	7
13	Temperature on the train	4.35080	5.50986	1.159	0.514	0.596	7
14	Clear and timely announcements of stops	4.31140	5.51090	1.200	0.480	0.576	7
15	Friendly, courteous, and quick service	4.24527	5.51283	1.268	0.454	0.575	7
16	Absence of offensive odors	4.62531	5.48172	0.856	0.654	0.560	8 -
17	Ease of paying fare, purchasing tokens	4.54374	5.54626	1.003	0.551	0.552	8
18	Cleanliness of the train interior	4.56273	5.41501	0.852	0.558	0.476	9 -
19	Freedom from the nuisance behaviors of others	4.71521	5.25303	0.538	0.584	0.314	10 -
20	Cleanliness of stations	4.67618	5.17164	0.495	0.469	0.232	11 -

SUN TRAN — ALBUQUERQUE, NEW MEXICO

8L. Sun Tran - Computation of Impact Scores

The top target attributes for Sun Tran customers determined from weighted data as defined in Appendix D and determined by the impact score approach are as shown below:

Sun Tran
Target Attributes
(N=303)

	Attribute
1	Frequency of service on Saturdays/Sundays
2	Hours of service during weekdays
3	Frequent service so that wait times are short
4	Reliable buses that come on schedule
5	Short wait time for transfers
6	Connecting bus service
7	Freedom from the nuisance behaviors of others
8	Availability of shelter and benches
9	Posted minutes to next bus

The target issues or attributes for Sun Tran are, first, travel performance attributes, followed by travel environment issues (See Tables 8.15 and 8.16 for impact scores).

Over half of Sun Tran customers say they had a problem over the past 30 days with the frequency of service on Saturdays and Sundays, and 45% report a problem with the hours of transit service during the week. Limited transit service has the greatest impact on overall customer satisfaction.

Sun Tran customers are less price sensitive than CTA customers, with none of the cost or value attributes placing within the top quadrant of concern.

Cleanliness of bus stops has a high dissatisfaction rank and a high problem occurrence rank (36%), but a low impact on overall satisfaction with transit service. This seems to indicate that customers do not hold the transit agency as directly responsible for this attribute as for others.

Sun Tran gets high marks on:

- Costs of making transfers
- Stop names visible from bus
- Safety from crime on the buses
- Accessibility of the buses to the handicapped
- Comfort of seats on the bus

8M. Sun Tran — Comparison with Quadrant Analysis

When impact score results for Sun Tran customers are compared with quadrant analysis results as shown in Chart 8.17, significant differences appear.

The quadrant analysis does not take into account the relatively low problem incidence rate for "availability of information by phone or mail". The quadrant analysis includes this attribute within the target issues; the impact score approach does not.

The quadrant analysis excludes "reliable buses that come on schedule", "freedom from the nuisance behaviors of others", "posted minutes to the next bus", and "connecting bus service" from the target area; the impact analysis includes these attributes within the target issues. The first three all have high problem incidence rates which are not taken into account by the quadrant analysis, while "connecting bus service", which has a relatively low problem occurrence rate, has a very high impact on overall satisfaction.

8N. *Sun Tran - Translation of Impact Scores to a Report Card*

Once impact scores are placed in descending order, statistically significant differences in ranking can be calculated using standard tests for statistical significance (Table 8.16). The table can then be simply divided by quadrants (adhering to statistically significant breaks in ranking) to assign report card grades to each individual service attribute.

For future Sun Tran tracking surveys, based on this benchmark survey, a grade level "D" can be assigned to all attributes with impact scores above 0.269, a "C" can be assigned to all impact scores within the range of 0.147 to 0.269, a "B" to impact scores between 0.079 to 0.146, and an "A" to impact scores below 0.079.

	Table 8.15 Computation of Impact Scores – Sun Tran (N=303) Attribute	Mean Overall Sat. w/ Problem	Mean Overall Sat. w/o Problem	Gap Value	Percent Who Had Problem	Impact Score	Report Card
1	Frequency of service on Saturdays and Sundays	6.71165	8.20391	1.492	0.575	0.858	D
2	Hours of service during weekdays	6.34320	8.10990	1.767	0.454	0.802	D
3	Frequent service so that wait times are short	6.34535	8.00453	1.659	0.424	0.703	D
4	Reliable buses that come on schedule	6.64539	7.98533	1.340	0.499	0.669	D
5	Short wait time for transfers	6.19392	7.88153	1.688	0.325	0.548	D
6	Connecting bus service	5.70243	7.81161	2.109	0.220	0.464	D
7	Freedom from the nuisance behaviors of others	6.56610	7.74306	1.177	0.363	0.427	D
8	Availability of shelter and benches	6.79795	7.72839	0.930	0.444	0.413	D
9	Posted minutes to next bus	6.53567	7.63188	1.096	0.286	0.314	D
10	Availability of seats on the bus	6.80008	7.57949	0.779	0.341	0.266	C
11	Absence of offensive odors	6.74047	7.58236	0.842	0.314	0.264	C
12	Physical condition of bus stops	6.62695	7.58742	0.960	0.265	0.255	C
13	Availability of information by phone and mail	4.68292	7.47849	2.796	0.091	0.254	C
14	Friendly, courteous, and quick service	6.41042	7.57092	1.161	0.213	0.247	C
15	Bus traveling at a safe speed	5.64977	7.49433	1.845	0.133	0.245	C
16	Availability of schedules/maps at stops	6.55621	7.50766	0.951	0.247	0.235	C
17	Cleanliness of the bus interior	6.62293	7.54500	0.922	0.251	0.231	C
18	Number of transfer points outside downtown	5.97704	7.32556	1.349	0.170	0.229	C
19	Routes/direction visible on buses	6.37641	7.53746	1.161	0.194	0.225	C
20	Buses that are not overcrowded	6.96623	7.53271	0.566	0.379	0.215	C
21	Frequency of delays for repairs/emergencies	6.72991	7.68394	0.954	0.222	0.212	C
22	Clear and timely announcements of stops	6.44527	7.53746	1.092	0.188	0.205	C
23	Cost effectiveness, affordability, and value	5.28781	7.68313	2.395	0.084	0.201	C
24	Smoothness of the ride and stops	6.83845	7.51191	0.673	0.291	0.196	C
25	Absence of graffiti	6.45057	7.41708	0.967	0.202	0.195	C
26	Ease of paying the fare	6.36349	7.45764	1.094	0.178	0.195	C
27	Safe and competent drivers	6.60627	7.50051	0.894	0.206	0.184	C
28	Explanations and announcement of delays	6.81129	7.48603	0.675	0.246	0.166	C
29	Availability of monthly/discount passes	6.73780	7.63960	0.902	0.165	0.149	C
30	Displaying of customer service number	6.50774	7.42109	0.913	0.160	0.146	B
31	Temperature on the bus	6.53278	7.45634	0.924	0.145	0.134	B
32	Physical condition of vehicles and infrastructure	5.55634	7.35358	1.797	0.074	0.133	B
33	Cleanliness of bus stops	7.02619	7.45588	0.430	0.307	0.132	B
34	Provision of signs and information in Spanish	4.67949	7.30646	2.627	0.040	0.105	B
35	Transit personnel who know the system	6.35187	7.61934	1.267	0.082	0.104	B
36	Safety from crime at bus stops	6.54418	7.42549	0.881	0.116	0.102	B
37	Cleanliness of the bus exterior	6.40449	7.40713	1.003	0.099	0.099	B
38	Ease of opening doors of the bus	6.88809	7.41428	0.526	0.186	0.098	B
39	Availability of handrails or grab bars	5.60407	7.31775	1.714	0.053	0.091	B
40	Fairness/consistency of fare structure	5.85207	7.62219	1.770	0.051	0.090	B
41	Cost of making transfers	5.63149	7.19186	1.560	0.050	0.078	A
42	Stop names visible from bus	6.71187	7.28215	0.570	0.108	0.062	A
43	Safety from crime on buses	6.48161	7.40716	0.926	0.064	0.059	A
44	Accessibility to those with a disability	6.80382	7.28734	0.484	0.088	0.043	A
45	Comfort of seats on the bus	7.45973	7.49189	0.032	0.129	0.004	A
46	Quietness of the vehicles	7.25733	7.21912	-0.038	0.082	-0.003	A

Table 8.16
Summary of Rankings and Scores - Sun Tran

	Median Importance Rank=4 Low Satisfaction >3 (N=303) Median Problem Experience Rank=7 (18%) Attribute Median Overall Satisfaction Gap Value Rank=4				Importance Ranking	Satisfaction Ranking	Percent Who Experienced Problem		Overall Satisfaction Gap		Impact Score	Report Card
			%	Rank			V	Rank				
1	Frequency of service on Saturdays and Sundays				4	7	57.5	1	1.5	3	0.858	(1) D
2	Hours of service during weekdays				2	5	45.4	2	1.8	2	0.802	(2) D
3	Frequent service so that wait times are short				2	5	42.4	3	1.7	3	0.703	(3) D
4	Reliable buses that come on schedule				1	4	49.9	2	1.3	4	0.669	(3) D
5	Short wait time for transfers				3	5	32.5	5	1.7	3	0.548	(4) D
6	Connecting bus service				3	4	22.0	7	2.1	2	0.464	(5) D
7	Freedom from the nuisance behaviors of others				3	4	36.3	4	1.2	4	0.427	(5) D
8	Availability of shelter and benches				4	6	44.4	3	0.9	5	0.413	(6) D
9	Posted minutes to next bus				5	6	28.6	5	1.1	4	0.314	(7) D
10	Availability of seats on the bus				4	3	34.1	4	0.8	5	0.266	(8) C
11	Absence of offensive odors				4	4	31.4	5	0.8	5	0.264	(8) C
12	Physical condition of bus stops				6	4	26.5	6	1.0	4	0.255	(8) C
13	Availability of information by phone and mail				4	5	9.1	9	2.8	1	0.254	*(8) C
14	Friendly, courteous, and quick service				3	2	21.3	7	1.2	4	0.247	(8) C
15	Bus traveling at a safe speed				2	1	13.3	9	1.8	2	0.245	*(8) C
16	Availability of schedules/maps at stops				5	6	24.7	6	1.0	4	0.235	(8) C
17	Cleanliness of the bus interior				3	4	25.1	6	0.9	5	0.231	(8) C
18	Number of transfer points outside downtown				5	4	17.0	8	1.3	4	0.229	*(8) C
19	Routes/direction visible on buses				5	4	19.4	7	1.2	4	0.225	(8) C
20	Buses that are not overcrowded				5	4	37.9	4	0.6	5	0.215	(9) C
21	Frequency of delays for repairs/emergencies				4	2	22.2	7	1.0	4	0.212	*(9) C
22	Clear and timely announcements of stops				6	2	18.8	7	1.1	4	0.205	(9) C
23	Cost effectiveness, affordability, and value				2	1	8.4	10	2.4	1	0.201	*(9) C
24	Smoothness of the ride and stops				5	3	29.1	5	0.7	5	0.196	(9) C
25	Absence of graffiti				6	3	20.2	7	1.0	4	0.195	*(9) C
26	Ease of paying the fare				6	4	17.8	7	1.1	4	0.195	(9) C
27	Safe and competent drivers				1	1	20.6	7	0.9	5	0.184	(9) C
28	Explanations and announcement of delays				5	5	24.6	6	0.7	5	0.166	(9) C
29	Availability of monthly/discount passes				2	2	16.5	8	0.9	5	0.149	*(9) C
30	Displaying of customer service number				6	5	16.0	8	0.9	5	0.146	(10) B
31	Temperature on the bus				4	2	14.5	8	0.9	5	0.134	(10) B
32	Physical condition of vehicles and infrastructure				4	2	7.4	10	1.8	2	0.133	*(10) B
33	Cleanliness of bus stops				6	4	30.7	5	0.4	6	0.132	(10) B
34	Provision of signs and information in Spanish				6	4	4.0	11	2.6	1	0.105	*(11) B
35	Transit personnel who know the system				3	2	8.2	10	1.3	4	0.104	*(11) B
36	Safety from crime at bus stops				2	2	11.6	9	0.9	5	0.102	(11) B
37	Cleanliness of the bus exterior				8	3	9.9	9	1.0	4	0.099	(11) B
38	Ease of opening doors of the bus				4	2	18.6	7	0.5	6	0.098	(11) B
39	Availability of handrails or grab bars				3	1	5.3	10	1.7	3	0.091	*(11) B
40	Fairness/consistency of fare structure				4	2	5.1	10	1.8	2	0.090	*(11) B
41	Cost of making transfers				6	1	5.0	10	1.6	3	0.078	*(12) A
42	Stop names visible from bus				3	1	10.8	9	0.6	5	0.062	*(12) A
43	Safety from crime on buses				1	1	6.4	10	0.9	5	0.059	(12) A
44	Accessibility to those with a disability				4	4	8.8	9	0.5	6	0.043	(12) A
45	Comfort of seats on the bus				6	2	12.9	9	0.0	7	0.004	*(13) A
46	Quietness of the vehicles				7	2	8.2	10	0.0	7	-0.003	*(13) A

() Numbers indicate statistically significant rank at the 90% confidence interval level *Split sample size=100 Shaded cells are above median

Chart 8.17
Quadrant Analysis of Performance (*Satisfaction*) vs. Importance
for Sun Tran Service



The intersection of the axis is the median rank value on importance (from left to right) and satisfaction (from bottom to top)

(N=303)

NOTE: Please refer to the numbered list of attributes in Tables 8.15 and 8.16 for descriptions of the attributes shown as numbers in the above chart.

The "target area" consists of the attributes that riders consider very important, but are rated low on satisfaction. The following attributes fell into the "target area" for Sun Tran:

- Frequency of service on Saturdays and Sundays
- Hours of service during weekdays
- Frequent service so that wait times are short
- Short wait time for transfers
- Availability of shelter and benches
- Availability of information by phone and mail

80. Sun Tran — Comparison with Factor Analysis

A factor analysis was performed on the 30 attributes not included in split sampling (all respondents were asked to rate each of these questions). The Sun Tran correlation results for the factor solution are displayed in Table 8.18 below. Five dimensions were found which are labeled: "trip performance", "personal security", "bus environment", "communications", and "seating comfort".

The communality correlations for the attributes within each dimension are as shown for each attribute.

Table 8.18
Factor Dimensions for Sun Tran Service

1 Trip Performance		2 Personal Security		3 Bus Environment		4 Communications	
Frequent Service	0.7424*	Stops Condition	0.7129*	Opening Doors	0.5275*	Maps at Stops	0.6766*
Wait for Transfers	0.5739*	Clean Stops	0.5554*	Ride Smoothness	0.5612*	Posted Schedule	0.5966*
Hours of Service	0.5348*	Absence of Odors	0.5702*	Clean Exteriors	0.5007*	Route Info. on Bus	0.5332*
Reliable, On-Time	0.5641*	Free of Nuisances	0.5962*	Safe Drivers	0.5455*	Delay Explanations	0.5945*
Connecting Service	0.6841*	Safety at Stops	0.6224*	Disability Access	0.5475*	Ease Paying Fare	0.4560*
Frequency Sat/Sun	0.4679*	Clean Interiors	0.5554*	Bus Temperature	0.3603*	Service # Display	0.4994*
		Shelters/Benches	0.5139*	Friendly Service	0.5842*	5 Seating Comfort	
		Safety on Bus	0.6224			Announcement Clarity	0.5299
						Not crowded	0.7211*
						Seat Availability	0.6615*

* values greater than 0.5 significance (N=303)

None of the intercorrelations among attributes is above the 0.8 level that would be considered highly correlated. All except one correlation are within the medium range of 0.4 to 0.8.

A complete review of bivariate correlation results for all 30 attributes shows that multicollinearity among attributes is extensive, even though most communality estimates for the dimension placements are significant. For example, cleanliness of the interior of the bus is related to the dimension of personal security at a significant level, but it is also highly related with attributes within the bus environment dimension such as temperature on the bus and ease of opening doors.

Sun Tran customers clearly equate bus stop condition, and cleanliness of stops and bus interiors, with attributes of personal safety.

On the basis of multiple regression analysis using the dimensions as the independent variables, the order of the dimensions in terms of their affect on overall satisfaction is as follows:

1. Trip performance
2. Communications
3. Personal security
4. Seating comfort
5. Bus environment

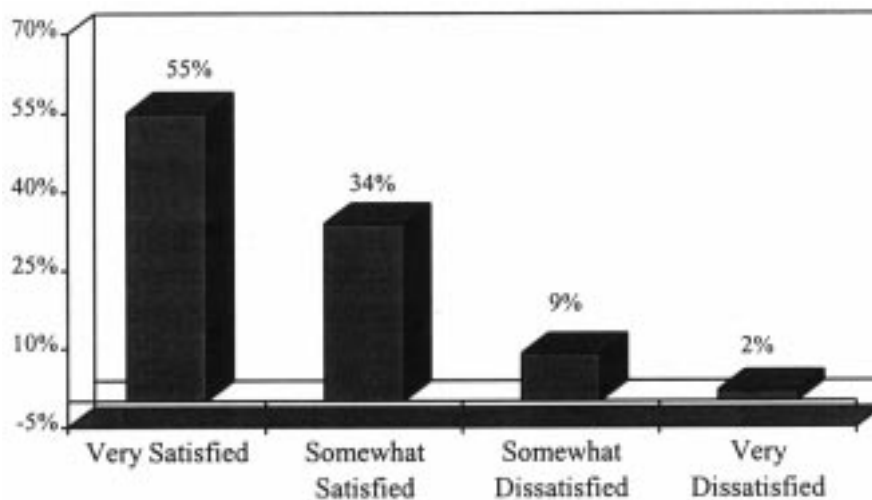
However, the differentiation in effect on overall satisfaction among the dimensions of personal security, seating comfort, and bus environment are only slight.

Two of the attributes identified by the impact score approach as within the top tier for target issues are not within the top factor analysis dimension — because they were not highly correlated with other trip performance attributes. These attributes are: freedom from the nuisance behaviors of others and posted minutes until the next bus. Freedom from nuisance behaviors is located within the third (or bottom) tier dimension(s) by the factor analysis approach, while posted minutes until the next bus is within the second tier dimension of communications. Both of these attributes have high rates of reported problems encountered.

8P. Market Segmentation of Sun Tran Satisfaction Findings

The overall satisfaction ratings of Sun Tran customers are shown in Chart 8.19. Overall, 55% report being very satisfied with Sun Tran service, and 34% are somewhat satisfied. Only 2% report being very dissatisfied and 9% somewhat dissatisfied.

Chart 8.19
Sun Tran Customer Overall Satisfaction with Service



As discussed in Chapter 4, customer loyalty is as important as customer satisfaction. It is important to determine, on the basis of key responses, which customers are secure in their use of public transit, which are favorable towards it, which are vulnerable to no longer using transit, and which are at risk of shifting to other forms of transportation.

A secure customer is one who says that he or she is:

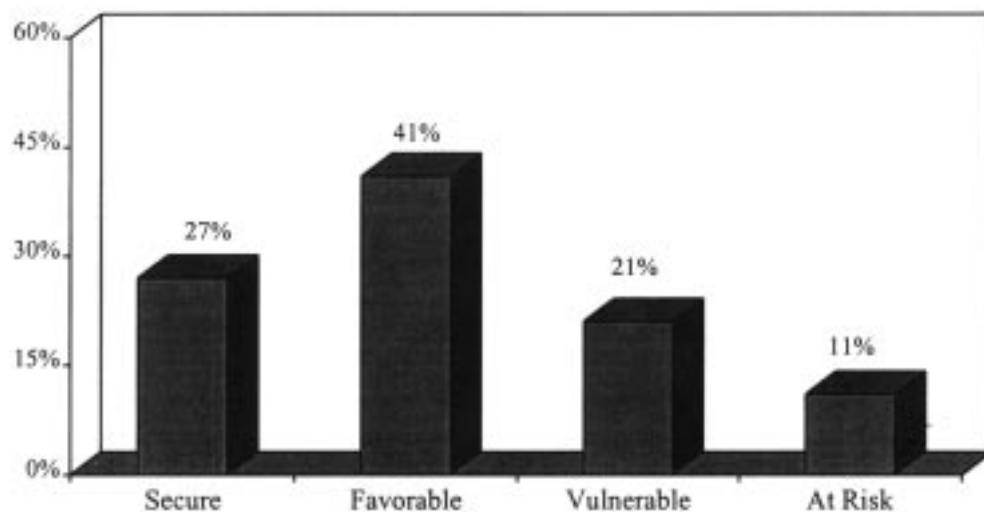
- very satisfied with the service
- definitely will continue to use the service in the future
- definitely would recommend the service to others

A vulnerable customers is one who says he or she is:

- somewhat satisfied or dissatisfied
- might or might not use the service in the future
- might or might not recommend the service to others

Among Sun Tran customers, 27% can be classified as secure customers, 41% as favorable, 21% as vulnerable customers, and 11% at risk of becoming non-customers (See Chart 8.20).

Chart 8.20
Customer Loyalty Segments Among Sun Tran Customers



Customer loyalty indices for public transportation are complicated by the issue of transit dependent customers. In Albuquerque, only 41% of secure customers say they use transit because they do not have a car available or because they do not drive, while 80% of combined vulnerable and at risk customers are in the transit dependent category. Again, as in Chicago, those who prefer to take transit rather than driving are more likely to be committed to Sun Tran use than those who use public transit because they must.

Vulnerable and at risk Sun Tran customers are not more likely to make transfers than secure customers, but they are more likely to report longer wait times between transfers (28 vs. 18 minutes) than secure customers. Vulnerable and at risk Sun Tran customers, on average, have lived within the Albuquerque area for a shorter period of time (11 years vs. 22 years), but are only slightly younger than secure customers (35 vs. 45 years old on average). There are no statistically significant differences between secure and vulnerable/at risk customers by income, employment, trip purpose, or gender. Vulnerable and at risk customers are more likely to be Caucasian and are less likely to be Hispanic.

Thirteen percent of vulnerable/at risk customers are either somewhat or very dissatisfied with Sun Tran service; 16% say they probably or definitely will not continue to use public transit in the future if another means of transportation becomes available to them. Sixteen percent say they would probably or definitely not recommend use of Sun Tran to a family member, friend, or co-worker.

Most important to market segmentation analysis is the ability to look at the ordering of service attributes by different segments of the market since we know not all customers are affected the same by all service quality elements. One of the greatest advantages of the impact score approach is that impact scores can be easily calculated and ordered by market segment, as for example, by secure and vulnerable/at risk customers as shown for Sun Tran in Table 8.21. As shown in Chart 8.20, secure customers represent 27% of the market while vulnerable/at risk customers account for 32% of the Sun Tran market.

"Availability of shelters and benches at stops", "availability of seats on the bus", and "bus traveling at a safe speed" are more important as target issues to secure customers. "The number of transfer points available outside downtown" is more important to vulnerable and at risk customers, while the "availability of seats on the bus" is less important.

Such segmentation of impact scores can be easily calculated for other market segments such as transit-dependent vs. non-transit dependent riders, or by geographic area, trip purpose, or primary destination.

Table 8.21 Computation of Impact Scores – Sun Tran Customer Loyalty Segments Attribute (N=303)		Mean Overall Sat. w/ Problem	Mean Overall Sat. w/o Problem	Gap Value	Percent Who Had Problem	Impact Score	Rank
Secure Customers							
1	Hours of service during weekdays	7.48515	8.69633	1.211	0.424	0.514	1
2	Frequency of service on Saturdays and Sundays	7.87545	8.54752	0.672	0.615	0.413	2
3	Reliable buses that come on schedule	7.74876	8.58853	0.840	0.463	0.389	2
4	Short wait time for transfers	7.41874	8.57841	1.160	0.314	0.364	2
5	Availability of shelter and benches	7.81956	8.55689	0.737	0.492	0.363	2 +
6	Availability of seats on the bus	7.50899	8.52467	1.016	0.318	0.323	2 +
7	Connecting bus service	7.13994	8.47067	1.331	0.209	0.278	3
8	Bus traveling at a safe speed	6.41917	8.43711	2.018	0.136	0.274	3 +
9	Frequent service so that wait times are short	7.79445	8.45495	0.661	0.402	0.266	3
10	Freedom from the nuisance behaviors of others	7.78429	8.42057	0.636	0.347	0.221	3
11	Absence of offensive odors	7.71150	8.40818	0.697	0.299	0.208	3
12	Physical condition of bus stops	7.72142	8.40671	0.685	0.290	0.199	3
13	Availability of schedules/maps at stops	7.69634	8.29292	0.597	0.214	0.128	4
14	Cleanliness of the bus interior	7.94489	8.29553	0.351	0.272	0.095	4
15	Posted minutes to next bus	7.90426	8.23418	0.330	0.260	0.086	4
16	Availability of information by phone and mail	6.67154	8.15822	1.487	0.043	0.064	5
17	Number of transfer points outside downtown	7.57362	7.91412	0.341	0.171	0.058	5
18	Friendly, courteous, and quick service	8.15105	8.20729	0.056	0.129	0.007	6
Vulnerable Customers							
1	Hours of service during weekdays	5.04121	7.07280	2.032	0.599	1.217	1
2	Frequency of service on Saturdays and Sundays	5.25395	6.85313	1.599	0.759	1.214	1
3	Frequent service so that wait times are short	4.89393	7.06618	2.172	0.557	1.210	1
4	Short wait time for transfers	4.61565	6.60199	1.986	0.420	0.834	2
5	Reliable buses that come on schedule	5.27080	6.60779	1.337	0.562	0.751	3
6	Connecting bus service	4.30330	6.47534	2.172	0.341	0.741	3
7	Availability of shelter and benches	4.79507	6.56279	1.768	0.395	0.698	3
8	Freedom from the nuisance behaviors of others	4.99120	6.47308	1.482	0.418	0.619	4
9	Number of transfer points outside downtown	4.13709	6.08379	1.947	0.263	0.512	5 +
10	Posted minutes to next bus	4.97654	6.33321	1.357	0.332	0.450	5
11	Physical condition of bus stops	4.88861	6.30198	1.413	0.315	0.445	5
12	Availability of information by phone and mail	4.21425	6.22139	2.007	0.184	0.369	6
13	Cleanliness of the bus interior	4.98172	6.19680	1.215	0.280	0.340	6
14	Absence of offensive odors	5.35840	6.15209	0.794	0.389	0.309	6
15	Bus traveling at a safe speed	4.34202	6.17452	1.833	0.167	0.306	6
16	Availability of schedules/maps at stops	5.15169	6.06183	0.910	0.305	0.278	7
17	Availability of seats on the bus	5.50022	6.09005	0.590	0.396	0.234	7 -
18	Friendly, courteous, and quick service	5.65749	5.96620	0.309	0.326	0.101	8

GREATER LYNCHBURG TRANSIT COMPANY — LYNCHBURG, VIRGINIA

8Q. GLTC - Computation of Impact Scores

The top target attributes for GLTC customers, determined from weighted data as defined in Appendix D, and determined by the impact score approach are as shown below:

GLTC
Target Attributes
(N=69)

	Attribute
1	Freedom from the nuisance behaviors of others
2	Reliable buses that come on schedule
3	Buses that are not overcrowded
4	Cleanliness of bus stops
5	Availability of seats on the bus
6	Smoothness of the ride and stops
7	Absence of offensive odors
8	Cleanliness of the bus interior
9	Explanations and announcement of delays
10	Frequent service so that wait times are short

The target issues or attributes for GLTC are primarily environment of service issues (See Tables 8.22 and 8.23 for impact scores).

Almost half of GLTC customers say they had a problem over the past 30 days with the frequency of service on Saturdays and Sundays; however, this attribute has a very weak impact on overall satisfaction with service. Almost one-third of customers report a problem with "freedom from the nuisance behaviors of others" and "cleanliness of bus stops"; however, the latter also does not have a large impact on overall satisfaction with transit service.

GLTC customers are less price sensitive than CTA customers, with none of the cost or value attributes placing within the top quadrant of concern.

Trains that are not overcrowded and availability of seats have a very high impact on the overall satisfaction of GLTC customers, but reported rates of problems encountered with these two attributes were relatively low and perhaps limited to certain routes, at certain hours.

GLTC gets high marks on:

- Costs of making transfers
- Physical condition of vehicles

8R. *GLTC - Translation of Impact Scores to a Report Card*

Once impact scores are placed in descending order, statistically significant differences in ranking can be calculated using standard tests for statistical significance (Table 8.23). The table can then be simply divided by quadrants (adhering to statistically significant breaks in ranking) to assign report card grades to each individual service attribute.

For future GLTC tracking surveys, based on this benchmark survey, a grade level "D" can be assigned to all attributes with impact scores above 0.214, a "C" can be assigned to all impact scores within the range of 0.057 to 0.214, a "B" to impact scores between 0.010 to 0.056, and an "A" to impact scores below 0.010.

	Table 8.22 Computation of Impact Scores - GLTC (N=69) Attribute	Mean Overall Sat. w/ Problem	Mean Overall Sat. w/o Problem	Gap Value	Percent Who Had Problem	Impact Score	Report Card
1	Freedom from the nuisance behaviors of others	7.90909	9.21739	1.308	0.319	0.417	D
2	Reliable buses that come on schedule	7.55556	9.13725	1.582	0.261	0.413	D
3	Buses that are not overcrowded	7.40000	9.18868	1.789	0.217	0.389	D
4	Cleanliness of bus stops	8.00000	9.06383	1.064	0.319	0.339	D
5	Availability of seats on the bus	7.38462	9.03571	1.651	0.188	0.310	D
6	Smoothness of the ride and stops	7.00000	9.01695	2.017	0.145	0.292	D
7	Absence of offensive odors	7.94444	9.00000	1.056	0.261	0.275	D
8	Cleanliness of the bus interior	7.27273	9.00000	1.727	0.159	0.275	D
9	Explanations and announcement of delays	7.53846	8.98182	1.443	0.188	0.272	D
10	Frequent service so that wait times are short	7.71429	8.98182	1.268	0.203	0.257	D
11	Availability of shelter and benches	8.20000	8.93878	0.739	0.290	0.214	C
12	Ease of opening doors of the bus	7.25000	8.91803	1.668	0.116	0.193	C
13	Connecting bus service	7.55556	8.88136	1.326	0.130	0.173	C
14	Displaying of customer service number	7.00000	8.86885	1.869	0.087	0.163	C
15	Safety from crime at bus stops	7.42857	8.85250	1.424	0.101	0.144	C
16	Physical condition of bus stops	8.14286	8.84906	0.706	0.203	0.143	C
17	Ease of paying the fare	7.77778	8.86000	1.082	0.130	0.141	C
18	Availability of monthly/discount passes	8.35600	9.00000	0.644	0.217	0.140	C
19	Frequency of delays for repairs/emergencies	8.00000	8.78947	0.789	0.174	0.137	C
20	Cleanliness of the bus exterior	6.75000	8.84615	2.096	0.058	0.122	C
21	Temperature on the bus	8.09091	8.84483	0.754	0.159	0.120	C
22	Short wait time for transfers	8.23077	8.78846	0.558	0.188	0.105	C
23	Friendly, courteous, and quick service	8.20000	8.81356	0.614	0.145	0.089	B
24	Posted minutes to next bus	7.80000	8.75410	0.954	0.072	0.069	B
25	Number of transfer points outside downtown	8.16667	8.40000	0.233	0.286	0.067	B
26	Safety from crime on buses	6.50000	8.79104	2.291	0.029	0.066	B
27	Clear and timely announcements of stops	8.00000	8.78125	0.781	0.072	0.056	B
28	Bus traveling at a safe speed	8.00000	9.19048	1.190	0.045	0.054	B
29	Availability of information by phone and mail	8.50000	9.05000	0.550	0.091	0.050	B
30	Transit personnel who know the system	8.49762	9.04762	0.550	0.087	0.048	B
31	Accessibility to those with a disability	7.66667	8.79365	1.127	0.043	0.048	B
32	Hours of service during weekdays	8.00000	8.76923	0.769	0.058	0.045	B
33	Safe and competent drivers	8.00000	8.76923	0.769	0.058	0.045	B
34	Comfort of seats on the bus	8.00000	8.86364	0.864	0.043	0.037	B
35	Fairness/consistency of fare structure	8.00000	8.68182	0.682	0.043	0.029	A
36	Quietness of the vehicles	8.00000	8.68182	0.682	0.043	0.029	A
37	Absence of graffiti	8.00000	8.69565	0.696	0.042	0.029	A
38	Frequency of service on Saturdays and Sundays	8.68750	8.75000	0.063	0.464	0.029	A
39	Stop names visible from bus	8.00000	8.56522	0.565	0.042	0.024	A
40	Cost effectiveness, affordability, and value	8.50000	8.66667	0.167	0.087	0.015	A
41	Route/direction visible on buses	8.50000	8.75385	0.254	0.029	0.007	A
42	Availability of schedules/maps at stops	8.66667	8.73016	0.063	0.087	0.006	A
43	Availability of handrails or grab bars	N/A	9.00000	N/A	0.000	0.000	A
44	Provision of signs and information in Spanish	N/A	8.84211	N/A	0.000	0.000	A
45	Physical condition of vehicles and infrastructure	N/A	8.54167	N/A	0.000	0.000	A
46	Cost of making transfers	N/A	8.47610	N/A	0.000	0.000	A

Table 8.23
Summary of Rankings and Scores - GLTC

	Attribute	Percent Who Experienced Problem		Overall Satisfaction Gap Value		Impact Score	Report Card		
		%	Rank	V	Rank				
Summary of Rankings and Scores - GTC		Importance Ranking	Satisfaction Ranking						
Median Importance Rank=2 Low Satisfaction >2 (N=69) Median Problem Experience Rank=3 (15%) Median Overall Satisfaction Gap Value Rank=2									
1	Freedom from the nuisance behaviors of others	2	3	31.9	2	1.3	2	0.417	(1) D
2	Reliable buses that come on schedule	2	2	26.1	2	1.6	2	0.413	(1) D
3	Buses that are not overcrowded	3	3	21.7	3	1.8	1	0.389	(1) D
4	Cleanliness of bus stops	3	3	31.9	2	1.1	3	0.339	(1) D
5	Availability of seats on the bus	2	2	18.8	3	1.7	2	0.310	(2) D
6	Smoothness of the ride and stops	3	2	14.5	3	2.0	1	0.292	(2) D
7	Absence of offensive odors	3	3	26.1	2	1.1	3	0.275	(2) D
8	Cleanliness of the bus interior	2	2	15.9	3	1.7	2	0.275	(2) D
9	Explanations and announcement of delays	2	3	18.8	3	1.4	2	0.272	(2) D
10	Frequent service so that wait times are short	2	2	20.3	3	1.3	2	0.257	(2) D
11	Availability of shelter and benches	2	3	29.0	2	0.7	3	0.214	(3) C
12	Ease of opening doors of bus	2	2	11.6	4	1.7	2	0.194	(3) C
13	Connecting bus service	2	2	13.0	4	1.3	2	0.173	(3) C
14	Displaying of a customer service phone number	3	3	8.7	4	1.9	1	0.163	(3) C
15	Safety from crime at bus stops	2	2	10.1	4	1.4	2	0.145	(3) C
16	Physical condition of bus stops	3	3	20.3	3	0.7	3	0.143	(3) C
17	Ease with which I can pay the fare	3	3	13.0	4	1.1	3	0.141	(3) C
18	Availability of monthly/discount passes	2	3	21.7	3	0.6	3	0.140	*(3) C
19	Frequency of delays for emergencies	3	3	17.4	3	0.8	3	0.137	*(3) C
20	Cleanliness of the bus exterior	3	2	5.8	5	2.1	1	0.122	(4) C
21	Temperature on the bus	2	2	15.9	3	0.8	3	0.120	(4) C
22	Short wait time for transfers	3	2	18.8	3	0.6	3	0.105	(4) C
23	Friendly, courteous, and quick service	2	2	14.5	3	0.6	3	0.089	(4) C
24	Posted minutes to next bus	3	2	7.2	4	1.0	3	0.069	(4) C
25	Number of transfer points outside downtown	3	4	28.6	2	0.2	4	0.067	*(4) C
26	Safety from crime on buses	1	2	2.9	5	2.3	1	0.066	(4) C
27	Clear and timely announcements of stops	3	2	7.2	4	0.8	3	0.056	(5) B
28	Bus traveling at a safe speed	1	1	4.5	5	1.2	3	0.054	*(5) B
29	Availability of information by phone and mail	2	3	9.1	4	0.6	4	0.050	(5) B
30	Transit personnel who know the system	2	2	8.7	4	0.6	4	0.048	*(5) B
31	Accessibility of buses for handicapped	2	2	4.3	5	1.1	3	0.048	(5) B
32	Hours of service during weekdays	2	2	5.8	5	0.8	3	0.045	(5) B
33	Safe and competent drivers	1	1	5.8	5	0.8	3	0.045	(5) B
34	Comfort of seats on the bus	3	1	4.3	5	0.9	3	0.037	*(5) B
35	Fairness and consistency of fare structures	3	2	4.3	5	0.7	3	0.029	*(5) B
36	Quietness of the vehicles	7	2	4.3	5	0.7	3	0.029	*(5) B
37	Absence of graffiti	4	2	4.2	5	0.7	3	0.029	*(5) B
38	Frequency of service on Saturdays and Sundays	3	4	46.4	1	0.1	4	0.029	(5) B
39	Stop names visible from bus	2	1	4.2	5	0.6	4	0.024	*(5) B
40	Cost effectiveness, affordability, and value	2	1	8.7	4	0.2	4	0.015	*(5) B
41	Route/direction information visible on buses	2	2	2.9	5	0.3	4	0.007	*(6) A
42	Availability of schedules/maps at stops	3	3	8.7	4	0.1	4	0.006	(6) A
43	Availability of handrails or grab bars	1	1	0.0	6	N/A	5	0.000	*(6) A
44	Provision of signs and information in Spanish	4	4	0.0	6	N/A	5	0.000	*(6) A
45	Physical condition of vehicles	3	2	0.0	6	N/A	5	0.000	*(6) A
46	Cost of making transfers	4	1	0.0	6	N/A	5	0.000	*(6) A

() Numbers indicate statistically significant rank at the 90% confidence interval level

*Split sample size=100

Shaded cells are above media

CHAPTER 9. AGENCY REVIEW OF CUSTOMER SATISFACTION SURVEY FINDINGS

Following the preparation of the draft project report outlined in Chapter 8, the results of the customer satisfaction surveys were shared with the three transit agencies used as field test sites. Following the distribution of these findings, interviews¹³ were conducted with senior staff of each agency to discuss the agency's reactions to the findings, the degree to which they concurred with the results, and how this process could be utilized in ongoing efforts on the part of the agency to both improve customer satisfaction and system performance. An important objective of this overall effort is to identify ways in which the results from the surveys can be utilized by transit agencies in their marketing and service improvement programs. Obtaining agency feedback on the specific survey results was considered an important means of determining how the results could thus be applied.

9A. *General Reactions to Results*

Each of the three agencies was in general agreement with the survey findings relevant to their service. The Assistant Director of Sun Tran said that the findings were remarkably consistent with the agency's perceptions of service needs and performance issues. She also felt that the results helped verify the agency's overall concerns about service delivery and also said the findings were consistent with what the agency has been hearing at public meetings when service issues are discussed. The Assistant Director indicated that the predominant concerns identified through the survey were related to level of service issues such as off-peak scheduling, frequency of service, and route coverage and added that Sun Tran has been experiencing financial shortfalls which have resulted in reductions of weekend, midday, and early a.m./late p.m. service in order to concentrate service during peak periods. This has led to exactly the kinds of concerns identified in the survey.

The Market Research Director for the CTA was also generally in agreement with the findings of the CTA surveys. He felt that the ratings, implied importance of service dimensions, and the "gap" concept made sense and that the findings were generally consistent with previous surveys undertaken by the CTA. The ratings also agreed with his own perceptions of CTA service. He noted however, that the list of attributes was quite extensive and, as a result, some of the attributes of this survey (e.g. odors, temperature) have not been addressed in previous CTA surveys. He indicated that there were no major surprises relative to CTA's findings, based on the CTA's ongoing, wide-ranging market research program. The CTA conducts a total of about 15 surveys per year, which involve a mix of telephone and intercept surveys. Intercept surveys include on-board surveys, surveys at rail platforms, and surveys at bus stops. The targets of the surveys range from rider surveys to more focused surveys of employees and students using the system. CTA staff have been collecting attitudinal data and monitoring riders' perceptions for a few years and are particularly interested in knowing what their customers want and how their perceptions change over time. In conjunction with these efforts, they are trying to understand how they can best "advertise" improvements in service to ensure that they are actually perceived by CTA customers.

The General Manager of the GLTC had some reservations about the findings of the survey and, in certain instances, felt that the results may be biased against certain isolated problems which are route- or schedule-specific. However he also noted that previous customer surveys conducted by the agency had identified similar customer's satisfaction issues as those identified in the current survey.

9B. Usefulness of Survey Procedures and Application of Findings

It was the general consensus of the participating transit agencies that the survey approach produced useful results which could be beneficial in identifying customer needs and service improvement priorities. Agencies felt that the process was practical for application, that the cost of implementation was reasonable, and that the results are understandable and useful.

The Assistant Director of Sun Tran indicated that the City of Albuquerque conducts an annual citizens' survey relevant to all services provided by the City. This survey always includes questions relevant to transit service, although they are usually very basic such as "Do you use public transit?" and "How often?" This year, due to activities related to the promotion of RTA formation, there were additional qualitative questions such as "Is transit service convenient for you?" However, more specificity is necessary to provide Sun Tran with usable information to evaluate customer needs and concerns. Therefore, the customer satisfaction survey was very useful for Sun Tran. A particularly important aspect was the way of using the survey to report not only the incidence and frequency of service-related problems but also riders' strength of sentiment. It was indicated that this kind of survey could be used to verify to the Division Managers that what they are doing to improve service matters to their customers. Once improvements are implemented, repeat surveys should be conducted to identify the next set of service improvement objectives. In terms of frequency, repeating the survey every two to three years was considered appropriate. It was also mentioned that the videotapes of the focus group sessions have been beneficial and that the tapes were shown to Division Managers to demonstrate that "the people who are complaining about service problems are not kooks; they are just like us."

The General Manager of GLTC concurred that the survey is understandable, and easily doable, a feature which is essential if tight-budget transit authorities are going to carry it out. He indicated that he intends to use the procedure in the future. However, he does not think that they will be able to carry out focus groups as part of the procedure. In terms of the ultimate benefits that might result from the procedure, it would be the agency's objectives to address the problems identified through the survey to improve customer satisfaction with transit services. He indicated that this would hopefully result in fewer complaints about service. He noted however that he did not think that improvements would result in increases in the number of passengers or the number of trips taken on the transit system because most of their riders are transit dependent. Instead, he hoped that by addressing these issues that the transit service would gain a more positive public image.

9C. Reactions to Findings Relevant to Specific Attributes

As part of the phone interviews, the transit agency representatives were asked to provide their reactions to the 10 most important service attributes identified in their respective customer surveys. These attribute-specific questions were intended to determine the basis for each specific customer satisfaction issue, discuss whether the agency is currently doing anything to monitor this attribute or similar performance characteristics, and identify how such data, as an agency monitored performance measure, might be systematically collected as an agency monitored performance measure. This information provides examples of how agencies might respond to customer concerns which are both operational or qualitative in nature.

1. *Sun Tran*

1.1 Frequency of service on Saturdays/Sundays

This is a complaint which Sun Tran receives frequently and is considered a function of recent financial constraints which have caused service reductions during off-peak periods and weekends. The Albuquerque City Council has recently funded a feasibility study to examine expanded weekend transit services, despite overall cutbacks in the city budget. (Although Albuquerque has a booming local economy, tax receipts have not grown as projected, resulting in an overcommitment of the city's tax revenues and cutbacks in city services).

This attribute can be readily monitored through a review of the current operating schedule. Progress in addressing customer satisfaction can be monitored by documenting enhancements to the weekend service schedule. Overall responsibility for making service changes is with Sun Tran's Service Development Division, although all division managers are briefed with respect to service changes.

1.2 Hours of service during weekdays

This attribute is closely linked with the preceding attribute of frequency of service. Again, this concern is a reflection of Sun Tran's financial condition, forcing an emphasis on the higher demand peak period service. Most Sun Tran routes terminate at the end of the peak (many have their last run at 4:45 p.m., most by 6:00 p.m.) This has presented a particular problem for workers in the convenience industry whose hours extend beyond the normal workday schedule. This, in turn, has affected employment decisions as a result of mobility limitations for the transit dependent population. Sun Tran has been told by some employers that they are unable to fill entry-level positions for early morning operations. This information has filtered back to Sun Tran as a result of their Welfare-to-Work efforts and TDM activities with local employers. Sun Tran recently conducted a phone survey of 40 employers and 450 welfare-to-work recipients and homeless shelter residents to better understand welfare-to-work issues. Results of the customer satisfaction survey corroborated the findings of the welfare-to-work survey.

As for the preceding attribute, this attribute can be readily monitored through a review of the current operating schedule. Progress in addressing customer satisfaction can be monitored by documenting enhancements to the weekday schedule. This is also the responsibility of the Service Development Division.

1.3. Frequent service so that wait times are short

Consistent with the factors contributing to the attributes related to service frequency, budgetary problems have led to reductions in service, particularly during the midday period. These reductions began in July 1995 when the system was redesigned from one which emphasized service between primary activity centers to a grid system. This contributed to improved transfer opportunities and coverage over a broader area. However, it also resulted in curtailment of services to outlying areas. This attribute may have been cited as a problem by customers who had previously used routes that had higher frequencies prior to July 1995 which were then cut back.

As for the preceding attributes, this attribute can be readily monitored through a review of the current operating schedule. Progress in addressing customer satisfaction can be monitored by documenting enhancements to the weekday schedule. This is also the responsibility of the Service Development Division.

1.4 Reliable buses that come on schedule

Schedule reliability has emerged relatively recently as a concern which Sun Tran had not previously made an effort to monitor. However, it is being cited more frequently as a concern in public meetings. Sun Tran has since made an effort to monitor schedule reliability through their on-going performance monitoring program. Initially this began with the monitoring of on-board announcement by drivers of upcoming stops.

Currently Sun Tran personnel ride on the buses and make an assessment of service reliability on a quarterly basis. The criteria applied for "on-time" performance is zero minutes for buses arriving early and no more than five minutes for buses arriving late; otherwise, the trip is considered to be off schedule. The findings from this review are presented and discussed at the Division Managers' meetings.

1.5 Short wait time for transfers

Transfers were examined at the time of the route restructuring in June 1995. To a large extent, the length of wait time is a function of the frequency of service, although basic service coordination is also a factor. As discussed in the preceding sections, service frequency had been affected by the agency's budgetary problems.

It is primarily the responsibility of drivers to notify the Service Development Manager if there is a problem in the coordination of services leading to excessive wait times for transfers.

1.6 Connecting bus service

It was unclear to Sun Tran what this attribute was indicating. It is likely that it was addressing the same issues as described in section 1.5 above. However, it may also be an indication that service is not available to certain desired destinations. In this case, the particular attribute was ambiguous. Sun Tran commented in this regard that a number of the attributes could be interpreted in various ways and that more information is needed for certain attributes to fully understand what the customer is saying.

1.7 Freedom from the nuisance behavior of others

Sun Tran was not surprised to see this attribute identified. A large percentage of their system riders use the Central Avenue (Route 66) bus and it travels through some "problem" neighborhoods, as described by Sun Tran. There may be potential social conflicts between some riders and individuals who board in these neighborhoods. It was also mentioned that Sun Tran does not have many school age riders, thereby minimizing the likelihood that this attribute was generated by friction between students and elderly riders. Sun Tran has begun using uniformed security personnel in the past year as a result of an assault which occurred following the de-boarding of two Sun Tran riders. However, Sun Tran does not feel that there was a general perception that transit was unsafe in Albuquerque.

1.8 Availability of shelter and benches

Sun Tran provides shelters at a number of high traffic locations throughout the system and is trying to install more through a cooperative program with the City Council and local businesses which would finance the structure and then post advertising on the shelter. Bus benches have been installed in the past year at all Sun Tran stops with the exception of locations where the terrain is prohibitive. The Service Development Division is responsible for installation and monitoring of bus stop amenities.

1.9 Posted minutes to next bus

This attribute is assumed to refer to the posting of schedules at bus stops, as opposed to some sort of real-time bus arrival information system (which would be impractical given the extent of Sun Tran's services). Originally Sun Tran only posted schedules at their downtown stop locations. However they have gotten requests from customers to expand this posting. As a result, there is now a policy to post schedules at all bus stops. This program is underway, although it is currently only 10% complete.

The Service Development Division is responsible for the posting of schedules at bus stops.

1.10 Availability of seats on the bus

Sun Tran is aware of crowding problems on the Central Avenue buses which occur throughout the day and on their express routes during peak periods. During peak periods the Central Avenue buses are filled to capacity and, as a result, additional buses have been added.

Crowding is not normally monitored by Sun Tran.

2. *Chicago Transit Authority*

2.1 Trains that are not overcrowded

Crowding is not considered to be a systemic problem but it is related to frequency of service and varies by route and time of day. It turns out that in some cases (e.g., Red line, one of the two lines surveyed) even during off-peak hours there is relative crowding because the headway gets reduced by about 50%.

Such decisions reflect a demand/load factor-driven approach. There are also instances especially throughout the bus system where service is offered very infrequently (up to 30 minutes headway) as a result of a policy decision to offer service on underutilized routes.

2.2 Reliable trains that come on schedule

Among CTA customers there is the perception that there are delays and service unreliability. Although CTA collects on-time performance (OTP) data, it is not easy to decipher what exactly the customer experiences. Data is collected by supervisors at selected stations, including the terminals and three or four intermediate stops. A train is counted as being late if it arrives more than five minutes late. As a result of this methodology, CTA statistics show an OTP higher than 95%. There are two categories with trains six to nine minutes late and trains arriving nine or more minutes behind schedule.

2.3 Frequent service so that wait times are short

As indicated in section 2.1 above, frequency of service varies by route and time of day. According to the CTA, frequent rail service is available at a system wide level 24 hours a day. Frequency drops by about half during off-peak. On the Red line, frequencies vary between 10 and 15 minutes and on the Blue line between 6 and 10 minutes.

2.4 Cost effectiveness, affordability, and value

It is assumed that this measure is primarily a function of fare policy. Currently, a one-way fare is \$1.50 and the cost of a one-way fare with a rail/bus or bus/bus transfer is \$1.80; the transfer is valid for two hours. There are some stations with free transfer (e.g., Howard station for rail/rail transfer to Evanston). Tokens are available in currency exchanges in batches of 10 tokens priced at \$15 (no discount). There is also the option of a monthly pass with unlimited usage priced at \$88. Finally, there is also a "value stored" card option where riders can store up to \$100 against future ticket usage. If more than \$13.50 is added to the card, riders are credited \$1.50, effectively a discount of 10% for the \$15 increment.

2.5 Availability of seats on train

This is assumed to be directly correlated with the attribute "Trains that are not overcrowded", which is discussed under section 2.1.

2.6 Explanations and announcement of delays

The CTA indicated that communicating with the riders has been an ongoing problem.

2.7 Frequency of delays for repairs/emergencies

Performance data indicate that Blue and Red lines have a worse record compared to the other CTA lines. Therefore, riders' perception seems to be consistent with the performance measure of "Mean Mileage between Reported Defects" and the measure of "Average Reported Defects by Car". Both performance indicators are also consistent with the age of the rolling stock. Orange and Brown lines with newest equipment show the best record in both of these measures.

2.8 Cleanliness of interior

The measures that CTA collects relevant to this attribute are clearly "supply driven" such as measures of the number of times that buses and rail cars get washed.

A report submitted by the Manager, Quality Improvement, Rail, entitled "Inspection of Cleanliness of Rail Cars" is sent to General Manager, Rail Engineering and Technical Services. The report classifies rail cars according to level of cleanliness (clean, semi-clean, dirty) before they are released for morning service.

According to a March 1996 report, from a total of 410 cars inspected 96% of rail cars entering service were clean with the remaining 4% characterized as semi-clean ("cars were swept but had papers/debris laying around"). According to an April 1996 report, of the 60 inspected cars that should have received a "mini wash", 90% were found clean while of the 60 inspected cars that should have received a full wash only 69% were classified as clean.

This indicates a great deal of variability relative to cleanliness. Furthermore, it was noted that this is only a measure of car cleanliness before they enter service.

2.9 Temperature on train

The CTA suggested that this might relate to potential problems mainly with air conditioning malfunctioning during the summer months especially on overcrowded trains.

2.10 Smoothness of ride and stops

This perception is a function of the alignment but, as is the case with service breakdowns, it also reflects the state of the infrastructure and the age and condition of the rolling stock. The Blue and Red lines have both aging rolling stock and, in sections of their route system, the infrastructure is also a candidate for updating.

3. *Greater Lynchburg Transportation Commission*

3.1 Freedom from the nuisance behaviors of others

GLTC thinks this attribute is primarily based on age differences among the population served. There can be conflicts between noisy teenagers and elderly passengers. The elderly passengers often do not feel comfortable when the noisy teenagers are present. GLTC logs complaints on a daily basis and looks at the frequency of complaints, and when possible, the time of day of complaints to determine if there are any trends. Complaints first go to the Front Office (by phone, mail, and sometimes they hear from city council members). If complaints have to do with passenger behavior, the complaint is referred to the Transportation Department. If the complaint has to do with cleanliness, the Maintenance Department is notified. If there is a decline in complaints about other passengers' poor behavior, GLTC would consider this progress or improvement. They would address an increase in such complaints in a number of ways:

- Supervisors would start riding buses on specific routes with increased complaints,
- The transit agency would notify local police of a growing incidence of complaints,
- In extreme cases, specific people would be banned from buses,
- Bus operators would be offered assistance and training in how to deal with unruly passengers, and
- Video technology could be installed; however, this presents an expensive option and would be used to record, but not necessarily reduce, nuisance behavior.

3.2 Reliable buses that come on schedule

This attribute was considered to be a function of a variety of causes, such as bus engines running hot; passengers having trouble reading the schedule; and people waiting at stops that are between two timepoints. GLTC operations reports show a 10% missed connection rate for timed connections. Some people say that "I was standing at a bus stop, and the bus just passed me by."

GLTC conducts hourly schedule checks which are the responsibility of the Transportation Department, specifically the transportation supervisors. Sixty to seventy percent of trips are monitored at connection points, while other missed connections are reported by the drivers. The overall number of missed connections is reported daily to the general manager. These data do not indicate a pattern of missed connections so far. Additional monitoring could be conducted utilizing GIS, a GPS tracking system, or more staff to monitor. Ideally, this information should be collected daily and reported monthly. However, these capabilities would cost money that the agency is not likely to get.

3.3 Buses that are not overcrowded

GLTC monitors bus crowding through customer complaints and random observations by supervisors. Occasionally ride checks are conducted, but not often enough to capture trends in crowding. They also do driver audits about every two years. GLTC hires outside firms to carry out these audits without the driver's knowledge to check how individual drivers are performing - not necessarily to monitor crowding. GLTC also collects Section 15 type data every five years. GLTC staff routinely look at ridechecks. Based on system averages, GLTC data do not indicate a widespread crowding problem.

Currently, GLTC does not consider it a significant problem. However, if GLTC determines that overcrowding becomes a significant problem, it is conceivable that more focused ridechecks could be conducted and drivers could report their loads to try to determine where and when overcrowding occurs.

3.4 Cleanliness of bus stops and shelters

The maintenance department is responsible for the cleanliness of the stops, shelters and buses. The issue of trash at the bus stops may be more a result of city policy than the transit agency's efforts to keep stops clean. A few years ago the city started charging \$0.90 per bag of garbage when picked up at residential properties. Residents must buy stickers that are then put on their garbage bags. Household garbage is deposited in the receptacles at bus stops (where there is no charge for depositing garbage) by individuals who do not want to pay this fee. This has contributed to more litter and debris at bus stops, creating a significant burden for GLTC.

3.5 Availability of seats on the bus

This is viewed as the same attribute as "Buses that are not overcrowded", which was discussed under section 3.3.

3.6 Smoothness of the ride and stops

GLTC monitors ride quality through supervisor observations and driver audits by monitoring bus speeds with radar guns and through customer complaints. GLTC believes operator training could be improved to encourage drivers to drive with more care. GLTC does not think that smoothness of ride is a function of the age or condition of their fleet. The fleet is relatively young, with the oldest buses built in 1990. It was noted that Lynchburg's nickname is Hill City because of its many hills, possibly contributing to the perceived lack of smooth riding.

3.7 Absence of offensive odors

GLTC thinks that riders' identification of offensive odors as a problem may be related to a small number of riders who do not bathe regularly. If it is a reoccurring problem, they may confront the person and help them find resources for better hygiene. Otherwise, it is not considered a significant or measurable problem.

3.8 Cleanliness of the bus interior

This attribute was not commented on by GLTC although it may correlate with "Cleanliness of bus stops and shelters", discussed under section 3.4.

3.9 Explanations and announcement of delays

GLTC agrees that passengers deserve an explanation of delays when they are happening. However, there is uncertainty regarding how this attribute could be monitored, other than asking drivers to report whether they made delay announcements or not, and recording the number of complaints that are registered about a specific delay. GLTC felt driver and supervisor training could be improved related to explaining delays to passengers.

3.10 Frequent service so that wait times are short

This attribute was not commented on by GLTC.

ENDNOTES

- ¹³ Phone interviews were conducted with Mike Carroll, General Manager of the Greater Lynchburg Transportation Commission on February 24, 1998, with Dawn Matson, Assistant Director of Sun Tran (Albuquerque, NM) on February 26, 1998, and with Darwin Stuart, Market Research Director, Chicago Transit Authority, on March 5, 1998.