



IDEA

**Innovations Deserving
Exploratory Analysis Programs**

Transit IDEA Program

CUSTOMER SATISFACTION INDEX FOR THE MASS TRANSIT INDUSTRY

Final Report for
Transit IDEA Project 1

Prepared by:
Tri-County Metropolitan Transportation District of Oregon
Portland Oregon

May 1995

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

Innovations Deserving Exploratory Analysis (IDEA) Programs Managed by the Transportation Research Board

This Transit IDEA project was funded by the Transit IDEA Program, which fosters development and testing of innovative concepts and methods for advancing transit practice. The Transit IDEA Program is funded by the Federal Transit Administration (FTA) as part of the Transit Cooperative Research Program (TCRP), a cooperative effort of the FTA, the Transportation Research Board (TRB) and the Transit Development Corporation, a nonprofit educational and research organization of the American Public Transportation Association (APTA).

The Transit IDEA Program is one of four IDEA programs managed by TRB. The other IDEA programs are listed below.

- NCHRP Highway IDEA Program, which focuses on advances in the design, construction, safety, and maintenance of highway systems, is part of the National Cooperative Highway Research Program.
- High-Speed Rail IDEA Program, which focuses on innovative methods and technology in support of the Federal Railroad Administration's (FRA) next-generation high-speed rail technology development program.
- Safety IDEA Program, which focuses on innovative approaches for improving railroad safety and intercity bus and truck safety. The Safety IDEA program is funded by the Federal Motor Carrier Safety Administration and the FRA.

Management of the four IDEA programs is coordinated to promote the development and testing of innovative concepts, methods, and technologies.

For information on the IDEA programs, look on the Internet at www.trb.org/idea or contact the IDEA programs office by telephone at (202) 334-3310 or by fax at (202) 334-3471.

IDEA Programs
Transportation Research Board
500 Fifth Street, NW
Washington, DC 20001

The project that is the subject of this contractor-authored report was a part of the Innovations Deserving Exploratory Analysis (IDEA) Programs, which are managed by the Transportation Research Board (TRB) with the approval of the Governing Board of the National Research Council. The members of the oversight committee that monitored the project and reviewed the report were chosen for their special competencies and with regard for appropriate balance. The views expressed in this report are those of the contractor who conducted the investigation documented in this report and do not necessarily reflect those of the Transportation Research Board, the National Research Council, or the sponsors of the IDEA Programs. This document has not been edited by TRB.

The Transportation Research Board of the National Academies, the National Research Council, and the organizations that sponsor the IDEA Programs do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of the investigation.

**CUSTOMER SATISFACTION INDEX
FOR THE MASS TRANSIT INDUSTRY**

Project Final Report

Transit IDEA Project 1

**Prepared for
Transit IDEA Program
Transportation Research Board
National Research Council**

**Prepared by
Tri-County Metropolitan Transportation District of Oregon
Portland Oregon**

May 1, 1995

Data Page (TRB)

Acknowledgements

Kathryn Coffel, Director
Marketing Information Department
Tri-County Metropolitan Transportation District of Oregon
4012 S.E. 17th Avenue
Portland, Oregon 97055
(503) 238-5860 FAX (503) 239-6469

Yvonne Lyon, Manager
Manager, Marketing Analysis
Tri-County Metropolitan Transportation District of Oregon
4012 S.E. 17th Avenue
Portland, Oregon 97055
(503) 239-6430 FAX (503) 239-6469

Paula Sonkin
Account Executive
J. D. Power and Associates
970 West 190th Street
Suite 480
Torrance, California 90502
(310) 323-1433 FAX (310) 323-1213

Ms. Louwana Oliva
Director of Communications
Metro Regional Transit Authority
416 Kenmore Blvd.
Akron, Ohio 44301-1099
(216) 762-7267 FAX (216) 762-0854

Ms. Lynn Otte
Manager, Market Development
Regional Transportation Authority
181 West Madison, Suite 1900
Chicago, Illinois 60602
(312) 917-0706 FAX (312) 917-0846

Ms. Debbie Alexander
Director of Marketing
Metropolitan Council Transit Operations
560 Sixth Avenue North
Minneapolis, Minnesota 55411-4398
(612) 349-7670 FAX (612) 349-7675

Mr. Steven Silkunas
Director, Technical Services and Research
Southeastern Pennsylvania Transportation Authority
841 Chestnut Street
Philadelphia, Pennsylvania 19107-4484
(215) 580-7977 FAX (215) 580-7997

TABLE OF CONTENTS

Page
Number

Executive Summary

IDEA Product

Concept and Innovation

Investigation

Assumptions

Methodology Used to Collect Data

Questionnaire

Sample and Methodology

Approaches Taken to Analyze the Data

Overall Customer Satisfaction Analysis

Factor and Regression Analysis

Overall Satisfaction and Factor Index Scores

Loyalty and Satisfaction Discriminate Analysis

Prioritization of Improvement Opportunities

Detailed Results

Bus Study

Light Rail Study

Heavy Rail Study

Plans for Implementation

Conclusions

APPENDIX SECTION

A: Guidelines for Adoption of CSI Methodology for Individual Transit Districts

B: Discussion of Statistical Analysis

C: Questionnaire

EXECUTIVE SUMMARY

Customer satisfaction research has long been used in private industry as a strategic tool to identify the opportunities management should pursue to improve customer satisfaction and increase sales. A number of transit agencies now conduct research to determine how they are meeting the needs of customers in their districts -- but the data is not collected on a uniform basis from district to district. Thus, the transit industry has been unable to determine how satisfied transit customers are with the products and services the industry has to offer. In addition, the individual agencies that monitor customer satisfaction have been unable to assess their own performance against peer or national scores.

This pilot Customer Satisfaction Index (CSI) research project is the first systematic, nonbiased, statistically sophisticated measure of customer satisfaction to be conducted across transit districts. For the first time, transit agencies have the ability to analyze their own performance, compare themselves directly to a total sample average, and compare and learn from other districts.

This demonstration project used CSI research methodology and directly applied the technique to five diverse transit districts. In general, a CSI project is conducted by having respondents rate a given product on a number of satisfaction attributes associated with that product (here, mass transit). To construct the CSI, attributes are rated and put through a factor analysis (to group attributes). Then, a regression analysis is performed to determine which factors are most closely associated with overall customer satisfaction. Beyond measuring satisfaction, CSI research provides actionable data with which companies can design products and programs that most effectively match customers desires and monitor the impact their strategies ultimately have on sales.

Tri-County Metropolitan Transportation District of Oregon (TRI-MET) of Portland, Oregon carried out the IDEA project in cooperation with four other transit agencies. To be useful to the transit industry, the CSI application was tested in a cross-section of transit properties throughout the United States. The transit districts that participated in the study include: Metro Regional Transit Authority (MRTA), Akron, Ohio; Regional Transportation Authority through the Chicago Transit Authority (CTA), Chicago, Illinois; Metropolitan Council Transit Operations (MCTO), Minneapolis, Minnesota; Southeastern Pennsylvania Transportation Authority (SEPTA), Philadelphia, Pennsylvania; and Tri-County Metropolitan Transportation District of Oregon (TRI-MET), Portland Oregon.

A telephone survey was conducted among 900 transit users in the 5 test cities: 500 bus, 200 light rail, and 200 heavy rail interviews were conducted. One common questionnaire that covered customer satisfaction for bus, light rail, and heavy rail was developed by all five transit districts. The questionnaire covered the following areas; overall customer satisfaction with bus/rail experience, measurement of the transit districts' performance on 35-40 transit attributes, likelihood of using bus/rail again, reasons for using transit; and demographics (gender, age, income, length of time living in the area). No open-ended questions were asked. Data from the 900 interviews were analyzed to determine the factors that most influenced overall customer satisfaction and the relative weight each factor possessed.

The study results indicate that customer satisfaction with mass transit is generally good. However, as satisfaction levels decline among transit users, there is a significant reduction in customer loyalty in terms of using transit again or recommending transit to a friend or relative. Therefore, to improve transit's image and increase ridership among current and potential customers, emphasis should be placed on improving those attributes that distinguish "Somewhat Satisfied" respondents from "Very Satisfied" respondents. The improvement opportunity areas offering the greatest return on investment (the "high leverage" opportunities) are those associated with driver courtesy, frequency of service, safety (security) and cleanliness of vehicles, train stations and bus stops.

It is important to note that safety (or security) issues are intricately tied to cleanliness. Vehicles, bus stops and train stations that obtained higher "cleanliness" ratings also carried an increased *perception* of personal safety from crime and the behavior of other people on the vehicles and at bus stops and train stations.

The CSI methodology was used to generate index scores (rankings) for bus and light rail transportation. Index scores were not generated for heavy rail because the two districts participating in this portion of the study (CTA and SEPTA) performed at parity in each of the factors contributing to overall satisfaction.

The index scores indicate how far above or below average an agency is rated (by definition, one half of the study population would be above average, the other below). It should be noted that, in absolute measures, all transit providers scored relatively well in the evaluations. The distinction for "how well" the districts scored relative to the others, is the value of the index comparison. For example, an index score of 125 indicates a rating 25% above the total sample average. The total sample average is set to 100 in the base measurement. Index scores for the test districts in this study are listed below:

Bus Study Index Scores: MRTA (111), MCTO (110), TRI-MET (106), SEPTA (91), and CTA (82)

Light Rail Study Index Scores: TRI-MET (118) and SEPTA (82)

The index scores magnify the differences between the transit districts in this study. Specifically, when looking at the results of the index scores for the bus segment, it is important to note that the three districts "above" average (MRTA, MCTO, and TRI-MET), are markedly different in size and character from the two districts "below" average (SEPTA and CTA). In other words, two distinct "segments" formed, where districts that are similar to each other, received similar scores. This was true for the light rail index as well.

These developments were in keeping with assumptions and illustrate the fact that a greater benefit to individual districts and the industry will be gained when a wider representation of transit districts is involved and the data can be analyzed in total *and* on a segment basis as well. However, this is not to say that districts of varying size cannot learn from one another. One of the purposes of this work was to identify those transit properties generating excellent customer satisfaction results and learn from them. Excellent customer service is not necessarily a function of district size -- rather it is the result of an agency's ability and commitment to match their services to the needs of the customer.

To increase the predictive power of the model generated in this study, additional studies may be necessary using larger sample sizes (minimum 200 interviews per mode, per city), and include expanded attitudinal measures, demographics and comparisons of modal differences within cities. Open-ended questions should be added to probe for reasons for riding transit and recommending (or not recommending) transit to a friend or family member. Respondents could also be asked what specific improvements they would like to see their transit districts implement.

The successful completion of this demonstration study enabled investigators to take the first step in producing a uniform measurement of customer satisfaction for the transit industry. The research currently planned under the Transit Cooperative Research Program (FY'95, Project B-11) "*Customer-Defined Transit Service Quality*" is likely to provide answers to several of the specific issues identified in the IDEA project.

IDEA PRODUCT

The purpose of this demonstration project was to develop for the transit industry a common methodology to determine customers' satisfaction with mass transit on local and national levels. The methodology adapted in this research study is

known as the Customer Satisfaction Index (CSI). The methodology, developed by J.D. Power and Associates, was applied for the IDEA study. CSI research methodology is a tool used by industry leaders in the private sector to gain a clear picture of customers' satisfaction with the products and services offered by an industry. In addition, individual companies are able to judge their own performance relative to their competitors within an industry, formulate strategies to improve their market positions and monitor the impact their strategies ultimately have on sales.

This IDEA project tested the application of the CSI methodology across five transit districts for identifying priorities to improve customer satisfaction and ridership. To gain a "national" scope, this pilot study was conducted in five transit districts in the United States of varying sizes including: Metro Regional Transit Authority (MRTA), Akron, Ohio; Regional Transportation Authority through the Chicago Transit Authority (CTA), Chicago, Illinois; Metropolitan Council Transit Operations (MCTO), Minneapolis, Minnesota; Southeastern Pennsylvania Transportation Authority (SEPTA), Philadelphia, Pennsylvania; and Tri-County Metropolitan Transportation District of Oregon (Tri-Met), Portland Oregon.

Using the data derived from the study, investigators were able to:

1. Identify the key factors driving customer satisfaction with transit in the five test cities, and the relative importance of each of those factors.
2. Construct overall customer satisfaction index scores and independent factors index scores for the total sample and for each transit district in the study.
3. Form a clear understanding of the performance of each transit district relative to the total sample and to other districts.
4. Identify and prioritize improvement opportunities for the transit districts in this project.

The investigators also developed guidelines for adoption of the CSI methodology by individual transit agencies. These guidelines are detailed in Appendix A.

CONCEPT AND INNOVATION

Customer satisfaction research has long been used in private industry as a strategic tool to identify the opportunities management should pursue to improve customer satisfaction and increase sales. A number of transit agencies now conduct research to determine how they are meeting the needs of customers in their districts -- but the data is not collected on a uniform basis from district to district. Thus, the transit industry has been unable to determine how satisfied transit customers are with the products and services the industry has to offer. In addition, the individual agencies that monitor customer satisfaction have been unable to assess their own performance against peer or national scores.

This pilot CSI research program is the first systematic, nonbiased, statistically sophisticated measure of customer satisfaction to be conducted across transit districts. For the first time, transit agencies have the ability to analyze their own performance, compare themselves directly to a total sample average, and compare and learn from other districts.

In general, a CSI project is conducted by having respondents rate a given product on a number of satisfaction attributes associated with that product (here, mass transit). To construct the CSI, attributes are rated and put through a factor analysis (to group attributes). Then, a regression analysis is performed to determine which factors are most closely associated with overall customer satisfaction. Beyond measuring satisfaction, CSI research provides actionable data with which companies can design products and programs that most effectively match customers desires, and monitor the impact their strategies ultimately have on sales.

INVESTIGATION

To enhance both the utility and the appropriateness of the information to be gathered from this project, all phases of the study design were the result of collaborations between the five transit districts (MRTA, CTA, MCTO, SEPTA, and TRI-MET) and the study consultant.

Assumptions

During the design phase of this demonstration program the following assumptions were made regarding the construction of the study and the use of the data derived from the investigation:

1. A minimum sample size of 100 respondents per mode, per city would be sufficient to demonstrate the usefulness of the methodology for transit research purposes.
2. The five transit districts involved were representative of the diversity of transit districts in the United States.
3. The collaboration of the five transit districts would produce a questionnaire that would be applicable to all five districts, but unique to none.
4. Data from the pilot project would add to existing data bases and not be used to substantiate or negate results from prior research in the individual districts.
5. The index derived from the pilot project would be applicable to the five districts in the study (the "total sample"), and would not be represented as an "industry index".
6. Districts of differing size and complexity would generate satisfaction scores reflecting the unique qualities of the districts under investigation.

Methodology Used for Collecting Data

Questionnaire

One common questionnaire was developed to collect the data, with slight programming adjustments made to accommodate the differences between bus and rail. The questionnaire used in this study is located in Appendix C. The questionnaire covered the following areas:

- Overall Satisfaction with bus/rail experience using a 5-point scale (5 = "Very Satisfied" to 1 = "Very Dissatisfied")
- Measurement of districts' performance on 35-40 attributes using a 5-point scale (5 = "Excellent" to 1 = "Poor")

- Likelihood of using bus/rail again
- Reasons for using transit (closed)
- Demographics (gender, age, income, length of time living in the area)

Sample and Methodology

Respondents were contacted by telephone using random-digit dialing in zip code areas provided by each of the five cities in the study. The lists of telephone numbers were scanned to include only residential numbers. The telephone methodology was chosen over other methods because it offered maximum control over respondent selection, provided consistency in data collection, and enabled quota sampling by city and transportation mode. Respondents were at least 16 years of age and had ridden the city's bus and/or rail system at least one time (one way) in the month prior to the study.

A total of 900 interviews were conducted in the test cities. Interview quotas were allocated as follows: 500 interviews (100 per city) among respondents who had ridden the bus at least once (one way) in the month prior to the study, 200 interviews among respondents who had used light rail at least once (one way) in the month prior to the study, and 200 interviews among respondents who had ridden heavy rail at least once (one way) in the month prior to the study. The interview allocations were as follows:

- MRTA (100 total): 100 bus interviews
- MCTO (100 Total): 100 bus interviews
- CTA (200 Total): 100 bus interviews, 100 heavy rail interviews
- SEPTA (300 Total): 100 bus interviews, 100 heavy rail interviews, 100 light rail interviews
- TRI-MET (200 Total): 100 bus interviews, 100 light rail interviews

In all districts, except MRTA, incidence levels were below projections. However, because the questionnaire length was shorter than expected (14 minutes actual versus 20 minutes estimated), the investigators were able to make the additional number of telephone calls necessary to complete the 900 interviews, and stay within time and budget guidelines. The low incidence rates may have occurred for the following of reasons:

1. Estimated incidence rates were for total ridership. In the cities of Chicago, Philadelphia and Portland, respondents were recruited by mode. Incidence rates by mode can and do differ, sometimes dramatically.
2. Estimated incidence rates quoted for Minneapolis was for ridership in the last year, not the last month as intended.
3. The interviews did not begin with a "warm-up" question favored by many researchers.

What impact, if any, the above issues may have had on the incidence rates is unknown at this time. However, these are points to keep in mind when considering studies of similar design and intent.

Approaches Taken to Analyze the Data

Data from the five test cities were first cleaned and checked for validity, logic and missing data (unanswered questions). A small amount of missing data occurred, but no patterns across districts were found. The intention of this research is to be a flexible management tool that can form the basis of an action plan to create measurable improvements in customer satisfaction. Consequently, the research can be analyzed on many levels. The following approaches were used to analyze the data in the study:

Overall Satisfaction Analysis

In the questionnaire respondents are asked to indicate their level of overall satisfaction with their last transit experience. This overall satisfaction question is the heart of this research method. In the questionnaire the following five levels of overall satisfaction were defined: "Very Satisfied", "Somewhat Satisfied", "Neither Satisfied Nor Dissatisfied", "Somewhat Dissatisfied", and "Very Dissatisfied". Answers to this overall satisfaction question were analyzed to determine the distribution of customer satisfaction with transit service along the "Very Satisfied" to "Very Dissatisfied" scale. This analysis was performed for the bus, light rail, and heavy rail segments of the study. . The "Detailed Results" section of this report discusses the results of these analyses.

Overall satisfaction was also the "dependent variable" against which independent factors were regressed to determine the factors most closely associated with customer satisfaction (see factor and regression analysis below).

Factor and Regression Analyses

The 35-40 transit attributes, identified in the questionnaire, underwent factor analysis. Factor analysis is a statistical methodology that involves clustering or grouping attributes that correlate around common themes or "factors". Generally, 7-10 independent factors emerge from the analysis.

The independent factors derived from the factor analysis were then *regressed* against the dependent variable. For this study, the dependent variable was overall customer satisfaction. This step determines each factor's contribution to overall customer satisfaction and is expressed by the weight that is assigned to the factor. Added together the factors' weights total 100%.

Those factors with a weight of 17% or higher were identified as "Highly Important" to customers' satisfaction in the test districts. Factor weights of 11%-16% were considered "Moderately Important", and factors that contribute 10% or less to overall satisfaction are considered to be of "Low Importance" to the customer. Factor and regression analyses were conducted for the bus, light rail, and heavy rail segments of the study

Overall Satisfaction Index Scores and Factor Index Scores

Index scores indicate the degree to which each city is different from the total sample average of all participating districts. The total sample average was set to 100 in this study. The index scores indicate how far above or below average an agency is rated. For example, an index score of 125 indicates a rating 25% above the total sample average.

Index scores are built through the following process:

1. Independent factors and the weight of each factor are derived using the factor and regression analyses described above.
2. Using the CSI formula, indices are generated for both overall customer satisfaction and for each of the factors.

The maximum possible index score represents what the score would be for a factor if each of the attributes comprising that factor was given an "Excellent" rating by all participating respondents. Crucial factors (those most heavily weighted), where the gap is the greatest between the index score and the maximum possible index score, represents an opportunity for improvement.

In this study, index scores were generated for both the bus and light rail segments. Index scores were not generated for the heavy rail study because the two districts participating in the heavy rail portion of the project (CTA and SEPTA) performed at parity in each of the factors contributing to overall satisfaction.

Loyalty Analysis and Satisfaction Discriminate Analysis

Loyalty (will use again or recommend to a friend) was measured along the overall customer satisfaction scale (“Very Satisfied” to “Very Dissatisfied”) to determine the relationship between loyalty and overall customer satisfaction. Survey data indicates that as overall customer satisfaction levels increase so does customer loyalty. As a result, satisfaction discriminate analyses were performed to determine what attribute improvements would most likely increase overall customer satisfaction levels.

A satisfaction discriminate analysis compares attributes performance scores between levels of overall satisfaction. To discriminate between two levels of overall satisfaction, the average attribute means scores for one level of satisfaction are compared, on a side-by-side basis, to the average attribute mean scores for another level of satisfaction. Then, for each attribute, significance testing (T-test) is conducted to determine if there are any statistically significant differences between the two levels. The resulting T-scores are then ranked from highest to lowest. Highest scores indicate the areas where the greatest degree of difference exists between levels and indicates the greatest opportunity for improvement in overall customer satisfaction.

The following overall satisfaction levels were compared in the study and the top satisfaction discriminators (T-scores) were generated for each comparison:

1. “Somewhat Satisfied” level compared with “Very Satisfied” level;
2. “Neither Satisfied Nor Dissatisfied” level compared with “Somewhat Satisfied” level; and
3. “Very Dissatisfied/Somewhat Dissatisfied” level compared with “Neither Satisfied Nor Dissatisfied” level.

Prioritization of Improvement Opportunities

To prioritize improvement opportunities, it is necessary to examine what a transit system "does well" versus "not so well" within the context of what is truly important to the customer. This was done by analyzing the importance (the weight) of a factor to overall customer satisfaction and by comparing the attribute scores within that factor against the total sample average attribute scores. For example, if a factor is weighted high (17% or above) then it is highly importance to overall customer satisfaction. Yet, if the attributes scores that comprise that factor are significantly below the total sample average attribute scores, then a transit system is not performing well within the context of what is truly important to the customer. Therefore, high priority should be placed on improving the attributes that comprise that factor. This would constitute a Priority 1 improvement opportunity.

Table 1 defines the four priority levels that were developed for the study. Priority 2 opportunities would focus on improving attributes where the scores are equal to or above the total sample average scores and where factor importance is high or moderate. Less benefit to individual agencies would be derived by focusing on Priorities 3 and 4 where factor importance is moderate or low and attribute scores are equal to or above the total sample average. Prioritization improvement opportunities were identified for all of the transit district participating in the study.

Detailed Results

Bus Study

A total of 500 bus interviews were conducted in the IDEA project. One hundred interviews were conducted for each transit district.

Overall Satisfaction Analysis

Overall customer satisfaction among bus passengers in each of the participating districts is at a respectable level. Table 2 lists the overall satisfaction survey results for bus service. With the exception of CTA, average mean scores (on a

five point scale) are all above 4.0. Although CTA is lower than the other districts, overall satisfaction among CTA passengers is positive (3.61).

The majority of respondents in each of the cities indicated that they are "Very Satisfied" or "Somewhat Satisfied" with their last bus trip. Over one-half of the respondents for MRTA, MCTO, and TRI-MET ranked themselves in the highest category, "Very Satisfied," and approximately one-third were "Somewhat Satisfied."

The percent of respondents for SEPTA and CTA who were "Very Satisfied" was appreciably lower than the other three districts. However, with nearly half of their respondents in the "Somewhat Satisfied" category, both SEPTA and CTA have opportunities to show strong gains in customer satisfaction by improving performance in those areas that will move customers from "Somewhat Satisfied" to "Very Satisfied."

The low percentage of respondents who were "Neither Satisfied Nor Dissatisfied" or "Dissatisfied" indicate that the transit districts involved in this study will benefit from focusing improvement efforts on maintaining "Very Satisfied" passengers at their current level and moving those passengers who are "Somewhat Satisfied" to "Very Satisfied."

Factor and Regression Analysis

Data from the 500 interviews underwent factor and regression analysis to determine the factors that most influenced overall customer satisfaction for bus travel and the relative weight each factor possessed. Eight factors emerged as contributing to overall satisfaction. Table 3 lists the factors and their weights, and the corresponding attributes and their weights.

The two most important factors, "Driver" and "System Performance", combined account for over one-third of overall satisfaction. Three of the factors, "Safety/Cleanliness-Deboarding Area", "Safety/Cleanliness of Waiting Area/Vehicle", and "Vehicle Cleanliness", directly relate to safety and also contribute to over one-third of overall satisfaction. Statistical analyses of this study indicates that there is a direct correlation between *perceived* safety and cleanliness. Passengers equate cleanliness with their personal safety from crime and the behavior of other people on the buses and at bus stops.

The remaining three factors, "Vehicle Attributes", "Bus Signage and Boarding Procedures", and "Shelters at Waiting Area", are also associated with customer satisfaction but are of less importance to transit customers. Even

though these factors are of "less importance," it does not mean that transit districts should neglect these areas. Rather, it is more likely that the transit districts in this study are already meeting customers' needs in these areas, though not to equal degrees. Should the districts' performance begin to weaken, it is likely that these factors would then increase in their importance for determining overall customer satisfaction.

The initial factor analysis identified two additional factors that were not found to significantly influence customer satisfaction. They are "Phone Access" (where you wait for or deboard the bus) and "Parking" (spaces where you catch the bus).

Table 4 list the eight factors and their weights for the total sample and for the five transit districts in the study. Because of the relatively small base size of respondents in each city (100), some of the factors do not significantly correlate with overall satisfaction in each of the test cities. The factor weights that are noted with an asterisk are statistically calculated estimates of what the contribution would be if the sample size was larger (minimum of 200 respondents per city).

It should be noted that, although each factor is statistically independent, improving performance on one factor (or an important attribute) can favorably impact scores in other areas. For example, a transit district may choose to improve the "Driver" factor and realize an improvement in the "System Performance" factor.

Overall Satisfaction and Factor Index Scores

Table 5 lists overall satisfaction index scores and index scores for each of the eight factors, for the total sample and for each transit property. When looking at the overall satisfaction index scores and the individual factor index scores, MRTA (Akron) captured the number one position. MRTA's first place ranking is the result of high scores in six of the eight factors contributing to customer satisfaction, a tie with MCTO (Minneapolis) in four, and a second place rank in the remaining two factors. Although MRTA's performance is impressive, it should be noted that there is a significant gap between MRTA's index scores and the maximum possible index scores, indicating that there is still opportunity to improve in each area.

MCTO (Minneapolis) and TRI-MET (Portland) received strong second and third place rankings (110 and 106 respectively). MCTO's second place performance is attributed to above average rankings in all eight factors (highest

scores on two factors). TRI-MET is in a very close third place, with above average scores on all factors and is on par with the two leaders on five out of eight factors.

SEPTA (Philadelphia) and CTA (Chicago) finished fourth and fifth, respectively. SEPTA's position is primarily due to below average index scores in each of the eight factors that are associated with overall satisfaction. Chicago's low index score is the result of last place rankings in each of the eight factors.

It is important to note that the three transit district that are "above" average (over 100) of a group of five, are markedly different in size and character than the two districts "below" average. In other words, it appears that two distinct "segments" have formed. This development is not a great surprise and indicates that the greatest benefits individual districts and the industry can gain from this type of research will be derived when a wider representation of transit districts is involved and data can be analyzed in total and on a segment basis as well.

Loyalty and Satisfaction Discriminate Analysis

Table 6 illustrates the relationship between customer loyalty and overall customer satisfaction. The data indicates that loyalty ratings for bus users increase precipitously as overall customer satisfaction levels rise. Therefore, the primary goal in each of the transit districts should be to elevate customer satisfaction levels among bus users to the highest levels.

Table 7 lists the top ten discriminators between "Somewhat Satisfied" respondents and "Very Satisfied" respondents. The results indicate that to successfully move "Somewhat Satisfied" passengers to "Very Satisfied" passengers, a transit property must focus on improving the following attributes:

1. Courtesy of bus drivers
2. Availability of seats
3. Safety from crime after getting off the bus
4. Ease of getting on/off the vehicle
5. Service received for the fare paid

Table 8 lists the top discriminators between “Neither Satisfied Nor Dissatisfied” respondents and “Somewhat Satisfied” respondents. To move those who were "Neither Satisfied Nor Dissatisfied" to "Somewhat Satisfied" the results indicate that attention should be paid to the following attributes:

1. Behavior of other people at the deboarding location
2. Service received for the fare paid
3. Driving competence of the driver
4. Smoothness of ride
5. Seating comfort

Table 9 lists the top discriminators between "Very Dissatisfied/Somewhat Dissatisfied" respondents and “Neither Satisfied Nor Dissatisfied” respondents. To move those who are "Very Dissatisfied/Somewhat Dissatisfied" to "Neither Satisfied Nor Dissatisfied", transit districts must focus on improving the following attributes:

1. Frequency of service
2. Cleanliness of vehicle interior
3. Safety from crime while on the bus
4. Behavior of other people at the boarding location
5. Knowledge of the driver about the system, routes and schedules

Prioritization of Improvement Opportunities

The following summarizes the high priority improvement opportunities yielded from this analysis for the transit districts participating in the bus segment of the study. See Table 1 for definition of prioritization categories.

MRTA - Akron:

Because MRTA’s scores are the highest and second highest among the participating districts in all areas, there are no Priority 1 opportunities to pursue. However, Akron should leverage off its strengths by improving the following factors that fall within the Priority 2 category:

- “Vehicle Attributes”
- “Safety/Cleanliness: Deboarding Area”

MCTO - Minneapolis:

MCTO demonstrates strong performance in all areas, and has no Priority 1 opportunities to pursue. MCTO should focus on improving the following factors that fall within the Priority 2 category:

- “System Performance”
- “Safety/Cleanliness: Waiting Area/Vehicle”

TRI-MET - Portland:

Tri-Met ranks above average and performs well in all areas and has no Priority 1 opportunities to pursue. Instead, focus should be placed on improving the following Priority 2 factors that are of importance to customers in Portland:

- “System Performance”
- “Driver”
- “Safety/Cleanliness: Waiting Area/Vehicles”

SEPTA - Philadelphia:

SEPTA scored below average in all areas and therefore, focus should be placed on improving both the following Priority 1 and 2 factors that are of importance to customers in Philadelphia:

- “Driver”
- “Vehicle Attributes”
- “System Performance”

CTA - Chicago:

CTA scored below average in all areas, and as a result Chicago has an opportunity to improve customer satisfaction by focusing attention on improving the following Priority 1 and 2 factors:

- “Shelters at Waiting Area”
- “Safety/Cleanliness: Deboarding Area”

- “Driver”
- “System Performance”

Light Rail Study

A total of 200 light rail interviews were conducted for this demonstration project; one hundred interviews for SEPTA (Philadelphia) and 100 for TRI-MET (Portland).

Overall Satisfaction Analysis

Overall customer satisfaction among light rail passengers for both TRI-MET and SEPTA was at respectable levels, 4.64 and 3.88 respectively (See Table 10 for details). Almost all (94%) of TRI-MET's light rail users indicated that they were "Somewhat Satisfied" or "Very Satisfied" with their last ride. The majority (74%) ranked themselves in the highest category, "Very Satisfied." At SEPTA, 71% of light rail riders indicated that they were "Somewhat Satisfied" or "Very Satisfied" with their last ride. Nearly one-third (31%) rated themselves "Very Satisfied" with their last light rail ride.

The low percentage of respondents who are "Neither Satisfied Nor Dissatisfied" or "Dissatisfied", indicates that the transit districts involved in this study will benefit from focusing improvement efforts to maintain "Very Satisfied" passengers at their current level, and moving those who are "Somewhat Satisfied" to "Very Satisfied."

Factor and Regression Analyses

Data from the 200 interviews underwent factor and regression analysis to determine the factors that most influenced overall customer satisfaction for light rail and the relative weight each factor possessed. Six factors emerged as contributing to overall satisfaction.. Table 10 lists the six factors and their weights, and the corresponding attributes and their weights. The three most important factors, "Vehicle Attributes", "Safety", and "System Performance" account for over almost two-thirds of overall customer satisfaction. The remaining three factors that contribute to overall customer satisfaction are "Stations", "Operator/Conductor", and "Phone Access".

Table 12 lists the six factors and their weights for the total sample and for the two transit districts participating in the light rail study. Results indicate that "Vehicle Attributes" and "Operator/Conductor" factors are more highly associated with customer satisfaction among SEPTA's light rail passengers. "System Performance", "Stations", and "Phone Access" are more important to TRI-MET customers. "Safety" issues are very important to light rail passengers in both districts, although to a higher degree for TRI-MET passengers.

Overall Satisfaction and Factor Index Scores

Overall satisfaction index scores and index scores for each of the six independent factors, were produced for both transit districts in the light rail study. Table 13 lists index scores for the total sample and for the two transit districts. When looking at the overall satisfaction index scores and the individual factor index scores, TRI-MET is ahead of SEPTA on "Overall Satisfaction" as a result of higher scores in each of the six factors. Although TRI-MET's performance is impressive, it should be noted that there is a significant gap between TRI-MET's index scores and the maximum possible scores, indicating that there is still opportunity to improve in each area, most notably in the "Safety" area

As was the case in the bus study, the performance gap between TRI-MET and SEPTA is most likely reflective of the size and character differences between the two transit districts. Again, this development was predictable and indicates that a wider representation of districts providing light rail services will enable researchers to analyze the data in total and on a "segment" basis.

Loyalty Analysis and Satisfaction Discriminate Analysis

Table 14 shows the relationship between customer loyalty and overall customer satisfaction. The data indicates that loyalty ratings for bus users increases precipitously as satisfaction levels increase. Hence, the primary goal in both districts should be to elevate customer satisfaction levels among light rail passengers.

Table 15 lists the top ten discriminators between “Somewhat Satisfied” respondents and “Very Satisfied” respondents for the light rail study. To successfully move "Somewhat Satisfied" passengers to "Very Satisfied" passengers, a transit property must excel in *all* areas. However the greatest benefits can be gained by improving the following attributes:

1. Smoothness of ride
2. Cleanliness of vehicle interior
3. Cleanliness of vehicle exterior
4. Ease of making transfers from the station
5. Clarity and timeliness of stop announcements

Table 16 lists the top discriminators between “Neither Satisfied Nor Dissatisfied” respondents and “Somewhat Satisfied” respondents. To move those who were "Neither Satisfied Nor Dissatisfied" to "Somewhat Satisfied", the following attributes should be improved:

1. Line for purchasing tickets or paying fares
2. Availability of car parking spaces
3. Temperature inside the vehicle
4. On-time performance
5. Cleanliness of vehicle exterior

Table 17 lists the top discriminators between "Very Dissatisfied/Somewhat Dissatisfied" respondents and “Neither Satisfied Nor Dissatisfied” respondents. To move those who are "Very Dissatisfied/Somewhat Dissatisfied" to "Neither Satisfied Nor Dissatisfied", transit districts must focus on improving the following attributes:

1. Ease of making transfers from the station
2. Behavior of other people at the train station (deboarding area)

3. Behavior of other passengers (on train)
4. Courtesy of the operator/conductor
5. Behavior of other people at the train station (waiting area)

Prioritization of Improvement Opportunities

The following summarizes the high priority improvement opportunities yielded from this analysis for TRI-MET and SEPTA (See Table 1 for prioritization chart).

TRI-MET - Portland:

Because of TRI-MET's high scores, no Priority 1 improvements should be pursued. Instead, TRI-MET should leverage off its' strengths by improving the following factors that are of Priority 2 importance to customers in Portland:

- "System Performance"
- "Safety"
- "Phone Access"
- "Stations"

SEPTA - Philadelphia:

Because SEPTA scores below average they should focus on improving the following factors that are of Priority 1 importance to the customers in Philadelphia:

- "Vehicle Attributes"
- "Operator/Conductor"
- "Safety"

Heavy Rail Study

A total of 200 heavy rail interviews were conducted; 100 for SEPTA (Philadelphia) and 100 for CTA (Chicago).

Overall Satisfaction Analysis

Overall customer satisfaction among heavy rail passengers for SEPTA and CTA are at respectable levels and on the positive side, 3.74 and 3.98 respectively (See Table 18 for details). Two-thirds (66%) of CTA's heavy rail users indicated that they were either "Very Satisfied" (36%) or "Somewhat Satisfied" (30%) with their last ride. Eighty percent of SEPTA's heavy rail users indicated that they were either "Very Satisfied" (33%) or "Somewhat Satisfied" (47%) with SEPTA's heavy rail service. As was found in the bus and light rail segments of this report, few respondents were dissatisfied with the service received in the heavy rail test cities. This finding indicates that both districts will make the greatest gains by maintaining "Very Satisfied" passengers and moving "Somewhat Satisfied" passengers into the "Very Satisfied" category.

Factor and Regression Analysis

Data from the 200 heavy rail interviews underwent factor and regression analysis to determine the factors that most influenced overall customer satisfaction and the relative weight each factor possessed. Seven factors emerged as contributing to overall satisfaction with heavy rail transit. Table 19 lists the seven factors and their weights, and the corresponding attributes and their weights. The three most important factors, "System Performance", "Operator/Conductor", and "Safety", combined account for over sixty percent of overall customer satisfaction. The remaining four factors that contribute to overall customer satisfaction are "Waiting Area at Station", "Vehicle Attributes", "Passenger Behavior", and "Phone Access", respectively. The initial factor analysis also identified one additional factor that was not found to significantly influence customer satisfaction, which was "Parking Availability" at the station where respondents catch their trains.

Table 20 lists the seven factors and their weights for the total sample and the two transit districts. Results show that "Operator/Conductor", "System Performance" are the factors most closely associated with customer satisfaction among SEPTA's heavy rail passengers. Of moderate importance to SEPTA riders was "Waiting Area At Station" and "Safety".

"System Performance", and "Safety" are the two factors most important to CTA passengers, followed by "Operator/Conductor" and "Phone Access".

Overall Satisfaction and Factor Index Scores

Because SEPTA and CTA performed at parity in each of the factors contributing to overall satisfaction, index scores could not be produced for the heavy rail study.

Loyalty Analysis and Satisfaction Discriminate Analysis

Table 21 illustrates the relationship between customer loyalty and overall customer satisfaction. The data indicates that loyalty ratings for bus users increases precipitously as satisfaction levels increase. Therefore, the primary goal in both districts should be to elevate overall customer satisfaction levels among heavy rail passengers to the highest levels.

Table 22 lists the top ten discriminators between "Somewhat Satisfied" respondents and "Very Satisfied" respondents for the heavy rail study. To successfully move "Somewhat Satisfied" passengers to "Very Satisfied" passengers, a transit property will obtain the greatest benefits by focusing on the following attributes:

1. Seating comfort
2. Service received for the fare paid
3. Cleanliness of vehicle interior
4. Behavior of other people at the train station (deboarding area)
5. Cleanliness of stations (waiting area)

Table 23 lists the top discriminators between "Neither Satisfied Nor Dissatisfied" respondents and "Somewhat Satisfied" respondents. To move respondents who were "Neither Satisfied Nor Dissatisfied" to "Somewhat Satisfied" the following attributes should be improved:

1. Travel time versus other modes of transportation you could have taken
2. Cleanliness of station (deboarding area)
3. Ease of getting on and off the vehicle
4. Access to pay phone (deboarding area)

5. Availability of car parking space

Table 24 lists the top discriminators between "Very Dissatisfied/Somewhat Dissatisfied" respondents and "Neither Satisfied Nor Dissatisfied" respondents. To move those who are "Very Dissatisfied/Somewhat Dissatisfied" to "Neither Satisfied Nor Dissatisfied", transit districts must focus on the following attributes:

1. Courtesy of the operator/conductor
2. Behavior of other people at the train station (deboarding area)
3. Courtesy and helpfulness of station staff (waiting area)
4. Service received for the fare paid
5. Safety from crime while waiting at the station

Prioritization of Improvement Opportunities Analysis

Because the two transit districts participating in the heavy rail study were rated so closely, neither district's attributes scores are rated significantly below the sample average, which is a criteria for Priority 1. Therefore, by definition no improvements opportunities can be classified as Priority 1. However, Priority 2 improvement opportunities, where factor importance is high and attribute scores are equal to the sample average, could be yielded for the heavy rail study. The following summarizes the Priority 2 improvement opportunities for CTA and SEPTA:

CTA - Chicago:

Highest priority should be placed on the following Priority 2 factors that are of most importance to customers in Chicago:

- "System Performance"
- "Safety"
- "Operator/Conductor"
- "Phone Access"

SEPTA - Philadelphia:

Focus should be placed on the following Priority 2 factors that are of most importance to SEPTA riders:

- “Operator/Conductor”
- “System Performance”
- “Waiting Area at Station”
- “Safety”

PLANS FOR IMPLEMENTATION

This pilot program has demonstrated that a common measurement can be used across transit districts to assist transit districts in (1) understanding the needs of their customers, (2) determining their performance individually and relative to other districts, (3) targeting improvement opportunities, (4) formulating solutions to service problems, and (5) monitoring the progress of improvement programs over time.

The greatest benefits from this research will increase as time goes by. The series of attributes and their factors can improve as more data is gathered across a wide variety of districts. Also, future versions of the questionnaire can evolve and become more and more applicable to a cross-section of transit properties. As the data bank increases, better demographics, ridership, usage, and attitude measures can be studied. However, for this to occur, development work must continue. The investigators envision a near-term and long-term approach to implementation of this research technique in the transit industry:

In the near-term and on a continuing basis, the investigators will work with individual agencies (and their consultants) wishing to implement this type of research program. The investigators have developed guidelines for adoption of the CSI methodology for individual transit agencies. The guidelines are detailed in Appendix A. Representatives from a number of districts have indicated a great deal of interest in this technique and its usefulness for customer satisfaction. The investigators will encourage districts to use the same methodology, the same questionnaire, and the same data analysis so that results can be compared uniformly from district to district.

The long-term intention is to attempt to recreate the index, with more transit districts, larger sample sizes, more attributes, and open-ended questions to find out "why" respondents may or may not recommend transit to others, or "what improvements" respondents would most like their transit districts to implement. The next study would provide a

deeper level of data, would represent a true "industry" index, and would provide true "peer" comparisons for participating transit districts. Investigators anticipate the long-term objective could be accomplished in two years.

The investigators presented the IDEA project at the TRB Annual Meeting in January 1995. As a result of that presentation, the investigators have received requests for presentations of the IDEA project results from numerous transit districts, oversight bodies and transit associations.

CONCLUSIONS

Results from this demonstration research program successfully illustrated the feasibility of using a common measurement of customer satisfaction to assist decision makers in transit achieve a better fit between the features of transit services and the needs of customers. The measurement used in this project (the CSI) provided total sample and "peer" scores against which participating transit districts could compare their results.

In looking at the results from an overall perspective (across cities and modes studied), it can be said that customer satisfaction with mass transit is generally good. However, as satisfaction levels decline among transit users, there is a significant reduction in customer loyalty in terms of using transit again or recommending transit to a friend or relative. Therefore, to improve transit's image and increase ridership among current and potential customers, transit districts must focus on moving people from "Somewhat Satisfied" to "Very Satisfied" levels.

To accomplish this task, emphasis should be placed on improving those attributes that separate "Somewhat Satisfied" respondents from "Very Satisfied" respondents. The attributes that separate "Somewhat Satisfied" respondents from "Very Satisfied" respondents are those associated with the courtesy of the drivers/operators, availability and comfort of seats, frequency of service, safety from crime while waiting for buses and trains, safety from crime while riding on public transit, and the cleanliness of transit vehicles, train stations and bus stops.

It is important to note that "Safety" (or security) issues are intricately tied to "Cleanliness." Vehicles, bus stops and train stations that obtained higher "cleanliness" ratings also carry an increased *perception* of safety -- safety in terms of personal safety at bus stops and train stations, safety while riding transit vehicles, and the behavior of other people on transit and at train stations and bus stops.

Results from this pilot study highlight the size and character differences between the transit districts in this study. Specifically, when looking at the index results, it is of great interest to see that districts of similar size and character are rated similarly. In other words, "segments" form. This was true across all modes studied.

This development was in keeping with the investigators assumptions and illustrates the fact that, a greater benefit to individual districts and the industry will be gained when a wider representation of transit districts is involved and the data can be analyzed in total and on a segment basis as well. However, this is not to say that districts of varying size cannot learn from one another. One of the purposes of this work is to identify those transit properties generating excellent customer satisfaction results and learn from them. Excellent customer service is not necessarily a function of district size -- rather it is the result of an agency's ability and commitment to matching their services to the needs of the customer.

Follow-up interviews with the research teams in the five transit districts, have indicated that the primary use of results from this project have been: (1) to create and/or promote customer satisfaction programs, (2) compare data collection techniques with existing customer satisfaction measurement programs, and (3) help direct budget expenditures for vehicle maintenance and service expansion.

The successful conclusion of this study marks the first step the transit industry has taken to establish customer satisfaction benchmarks against which transit services can be realistically delivered. Much more work needs to be done in this area to increase the predictive power of the model designed in this project and to develop a research program that can easily make the transition from local to national levels and maintain value at each level. The investigators will work with researchers from other transit districts to design future studies that will include larger sample sizes (200-500 interviews per mode, per city), compare modal differences within cities, and expand demographic and attitudinal information. The follow-on research planned under a Transit Cooperative Research Project (FY '95, Project B-11) "*Customer-Defined Transit Service Quality*" is designed to provide answers to several of the specific issues identified in the Transit IDEA project and broaden the application of the CSI concept developed in the Transit IDEA project..

APPENDIX A APPENDIX A

GUIDELINES FOR ADOPTION OF CSI METHODOLOGY FOR INDIVIDUAL DISTRICTS

This demonstration project included multiple transit districts for the purposes of deriving an overall index. In the absence of data from other transit districts, individual agencies can use the methodology described in this study to design a useful customer satisfaction research program for their own individual districts. The following guidelines are offered to adapt this CSI methodology for use in individual districts:

Initial Steps

1. Define the objectives for conducting the study.
2. Identify management decisions to be made as a result of the information derived from the study.
3. Determine the scope (modes and geographic area) of the investigation.
4. Identify available funds. Costs to conduct a study such as this can vary from district to district and can be influenced by the number of interviews desired, incidence rate by mode, telephone interview method used (computer assisted or pencil/paper), questionnaire length, the number of open end questions included, the amount of analysis requested, and vendor competition.

Methodology To Use For Collecting Data

Conduct a telephone survey, using random-digit-dialing in the test area. Only residential number should be used in the survey. Interviews should be conducted using a computer assisted telephone interviewing (CATI) package

Sample

Survey should include at least 200 respondents per mode studied. Respondents should be at least 16 years of age and should have ridden the city's transit system at least once (one way) in the month prior to the study.

Questionnaire

Use one common questionnaire to collect the data, with programming adjustments to accommodate differences between modes studied. The following areas of inquiry are suggested:

- Overall Satisfaction with bus/rail experience using a 5-point scale (5 = "Very Satisfied" to 1 = "Very Dissatisfied")
- Measurement of districts' performance on 35-40 attributes using a 5-point scale (5 = "Excellent" to 1 = "Poor")
- Likelihood of using bus/rail again
- Reasons for using transit (closed)
- Demographics (gender, age, income, length of time living in the area)

If a respondent's last bus or rail trip required more than one vehicle, they were asked to rate only "the very last" bus or rail vehicle they rode.

A copy of the questionnaire used in this study can be found in Appendix C. The length of the questionnaire averaged 14 minutes. Depending on the scope of the survey and the budget available, open-end questions could be added that would enrich the data concerning "loyalty" questions. Questions such as:

- "What *one thing* would you like (your district) to change?"
- "Why would you recommend/not recommend this service to a friend or family member?"

Approaches to Analyze Data

Individual agencies can analyze their data in a number of ways and the following outlines some of the most common approaches. This research methodology is not a "one-size-fits-all" approach to research, but is designed to be a flexible tool, applicable to a variety of situations. Thus, the following list should not be interpreted as a comprehensive list of analytical options available to researchers.

Overall Satisfaction Analysis

The overall satisfaction question is the heart of this research method. Respondents are asked to indicate their level of satisfaction with their last transit experience. Responses range from "Very Satisfied" to "Very Dissatisfied". The data is used:

- To determine the distribution of overall customer satisfaction with transit service along the "Very Satisfied" to "Very Dissatisfied" scale, and
- As the dependent variable against which independent factors are regressed to determine which factors are most closely associated with customer satisfaction (See Factor and Regression Analysis below).

Factor and Regression Analysis

In the questionnaire respondents are asked to rate their transit district's performance on 35-40 attributes. Mean scores for each transit attribute can be subjected to a factor analysis, which statistically groups the attributes into independent factors. The independent factors can then be regressed against the dependent variable, which is overall customer satisfaction. This step assigns weights to each factor, which reflects each factor's contribution to overall customer satisfaction.

Overall Satisfaction Index Scores and Factor Index Scores

To build an index would require the participation of more than one transit district. Index scores indicate the degree to which each transit district is different from the total sample average of all participating districts. The index scores indicate how far above or below average an agency is rated. For example, an index score of 125 indicates a rating 25% above the total sample average. The customer satisfaction indices that were built for this IDEA project were created using J.D. Power and Associates' Index Formula. The creation of the index formula is not included in this report, because it is proprietary information of J.D. Power and Associates. Should a group of transit districts wish to replicate the index, then J.D. Power could be contacted, or another vendor could be contacted to develop an alternative form of indexing. Index scores are built through the following process:

1. Independent factors and the weight of each factor are derived using the factor and regression analyses described above.

2. Using the CSI formula, indices are generated for both overall customer satisfaction and for each of the factors.

The maximum possible index score represents what the score would be for a factor if each of the attributes comprising that factor was given an "Excellent" rating by all participating respondents. Crucial factors (those most heavily weighted), where the gap is the greatest between the highest index score and the maximum possible index score, represents an opportunity for improvement.

Loyalty Analysis

Customer loyalty (will use again or recommend to a friend) as it relates to overall satisfaction is a useful analysis. Data can be used by transit agency researchers to determine if and to what degree loyalty increases as overall satisfaction levels increase.

Satisfaction Discriminate Analysis

A satisfaction discriminate analysis can be performed to compare attributes performance scores between different levels of overall customer satisfaction. To discriminate between two levels of overall satisfaction, the average attribute means scores for one level of satisfaction can be compared, on a side-by-side basis, to the average attribute mean scores for another level. Then, for each attribute, significance testing (T-test) can be conducted to determine if there are statistically significant differences between the two levels. The resulting T-scores can be ranked from highest to lowest. Highest scores indicate the areas where the greatest degree of difference exists between levels and indicates the greatest opportunity for improvement in customer satisfaction.

The following overall customer satisfaction level comparisons are suggested for satisfaction discriminate analyses:

1. "Somewhat Satisfied" versus those who are "Very Satisfied"
2. "Neither Satisfied Nor Dissatisfied" versus those who are "Somewhat Satisfied"

3. "Very Dissatisfied/Somewhat Dissatisfied" versus those who are "Neither Satisfied Nor Dissatisfied"

Prioritization of Improvement Opportunities

To prioritize improvement opportunities, it is necessary to examine what a transit system "does well" versus "not so well" within the context of what is truly important to the customer. This can be done by analyzing the importance (the weight) of a factor to overall customer satisfaction and by comparing the attribute scores within that factor against the total sample average scores. For example, if a factor is weighted high (17% or above) then it is highly important to overall customer satisfaction. Yet, if the attributes scores that comprise that factor are significantly below the total sample average scores, then a transit system is not performing well within the context of what is truly important to the customer. Therefore, high priority should be placed on improving the attributes that comprise that factor. This would constitute a Priority 1 improvement opportunity.

Table 1 defines the four priority levels that were developed for the IDEA project. Priority 2 opportunities would focus on improving attributes where the scores are equal to or above the total sample average scores and where factor importance is high or moderate. Less benefit to individual agencies would be derived by focusing on Priorities 3 and 4 where factor importance is moderate or low and attribute scores are equal to or above the total sample average.

Segmentation Analysis

Segments of a population can be compared and contrasted. For example, analyses can be performed to determine overall satisfaction levels between "Occasional" and "Frequent" riders, "Commuters" and "Non-commuters", or, satisfaction by Number of Transfers, by Gender, or by Geographic Region.

Tracking Analysis

Tracking studies can be conducted to determine the effectiveness that improvement strategies have on customer satisfaction for a transit district and, ultimately, on ridership.

APPENDIX B

THE J.D. POWER AND ASSOCIATES INDEX METHODOLOGY AND THE ANALYSIS CONDUCTED FOR THE IDEA STUDY

Discussion of Statistical Analysis:

The Index methodology is a model of the industry under examination. The modeling process provides importance weights. Models based on derived importance highlight variables that co-vary with some overall measure of satisfaction. The greater the degree of co-variation (that is "correlation") the greater the importance.

The most salient advantage of modeling importance is the provision of goodness of fit statistics. Goodness of fit statistics provide a means of evaluating how well the model predicts, or alternatively how well the battery of questions in the questionnaire capture the nature of the market under examination. Two goodness of fit statistics are the Percent of Variance accounted for when predicting overall satisfaction, and the Spearman Rank Order correlation of the Predicted values of overall satisfaction and the actual values of overall satisfaction. For all models in the CSI demonstration project, the Percent of variance accounted for is in the mid 30's. The Spearman Rank Order correlation's are all 1.0. This means the current models are sufficient to accurately predict the rank order of overall satisfaction by city within mode of transit system. Scores such as these are considered a good *beginning* and not an unusual "first run" for a study of this size and design. However, more work needs to be done with larger sample sizes and more transit districts to fully define the structures of the various transit modes. As the experience increases within the industry, stronger scores can be expected.

The modeling process involves a regression analysis where overall satisfaction is predicted by respondent answers to a battery of questions concerning their transit experience. Regression procedures require that the predicting variables have little to no intercorrelations (that is, the "multicollinearity" problem). Violation of multicollinearity constraints can lead to highly misleading results. In order to remove the intercorrelations, a statistical procedure called the Principal Components analysis is performed (Factor Analysis is often used as a generic name for this procedure).

Principal Components provides a transformation that removes the intercorrelations among the predictor variables. This process finds variables that have strong intercorrelations and creates a composite variable containing the information in the intercorrelated set. The end result is a series of groups, for factors, that have been adjusted to have zero correlation with each other. These factors, representing independent chunks of information, are then regressed to the overall satisfaction variable. The resultant regression weights are proportioned to one hundred percent.

Knowing that a factor such as "Safety/Cleanliness: Boarding Area" for the bus modality accounts for 15% of overall satisfaction is an interesting finding. However, each factor consists of several elements, and it would be nice to know how the importance of each individual variable within each factor. In order to provide those weights, a second principal components analysis is performed among each factors elements. Thus, the analysis is being used to statistically remove the intercorrelations among the individual variables within each factor. Once the variables are transformed to independence, they are regressed to the overall satisfaction variable. This provides weights for each individual variable. With the bus modality as an example, the "Safety/Cleanliness: Boarding Area" factor accounts for 15% of the total variation, and of that 15%, the three variables in that factor account for 5.4, 4.5 and 5.1 percent of the factor total.

This analysis completes most of the modeling procedure. Each variable has a weight, and each factor (grouping of variables) has a weight. Using these weights and each respondent's scores on the individual variable, an additive models is constructed. The additive model is centered so the overall mean score is 100 with a spread of some number of points. The resultant model provides a scaled overall predicted value of overall satisfaction (the "Index"), and values for each of the factors isolated (the "measures").

The calculation of the factor weights are often performed on different segments of the market. For example, commuters and non-commuters. This provides important information on how importance may vary as a function different target groups.

APPENDIX B

TABLE 1 Priority 1-4 Definitions, CSI Study

Priority		Criteria
1	Where: And:	Factor Importance is: <i>High</i> (17% and above) Attribute Scores are: <i>Significantly Below</i> Sample Average
2	Where: And: And/Or Where: And:	Factor Importance is: <i>High</i> (17% and above) Attribute Scores are: <i>Equal to or Above</i> Sample Average Factor Importance is: <i>Moderate</i> (11%-16%) Attribute Scores are: <i>Significantly Below</i> Sample Average
3	Where: And: And/Or Where: And:	Factor Importance is: <i>Moderate</i> (11%-16%) Attribute Scores are: <i>Equal to or Above</i> Sample Average Factor Importance is: <i>Low</i> (10% or less) Attribute Scores are: <i>Significantly Below</i> Sample Average
4	Where: And:	Factor Importance is: <i>Low</i> (10% or less) Attribute Scores are: <i>Equal to or Above</i> Sample Average

TABLE 2 Overall Customer Satisfaction Ratings, CSI Bus Study

Overall Customer Satisfaction Levels	Percentage of Respondents					
	Total Sample	MRTA	CTA	MCTO	SEPTA	TRI-MET
Very Satisfied (5)	44 %	53 %	23 %	58 %	35 %	52 %
Somewhat Satisfied (4)	37 %	37 %	43 %	28 %	45 %	32 %
Total Satisfied (4 & 5)	81 %	90 %	66 %	86 %	80 %	84 %
Neither Satisfied/ Dissatisfied (3)	9 %	4 %	13 %	7 %	12 %	11 %
Somewhat Dissatisfied (2)	6 %	4 %	14 %	6 %	4 %	2 %
Very Dissatisfied (1)	3 %	1 %	7 %	1 %	4 %	3 %
Total Dissatisfied (1 & 2)	9 %	5 %	21 %	7 %	8 %	5 %
Total Sample	500	100	100	100	100	100
Mean Attribute Scores	4.13	4.38	3.61	4.36	4.03	4.28

TABLE 3 Factor Structure, CSI Bus Study

Factor (Weights) and Attribute (Weights) Total 100%
<p>Driver (17%) Courtesy of driver (27%) Driving competence of driver (25%) Clarity and timeliness of stop announcements (19%) Knowledge about the system routes and schedules (18%) Personal appearance (11%)</p>
<p>System Performance (17%) Service received for the fare paid (32%) On-time performance (24%) Frequency of service (23%) Travel time versus other modes of transportation you could have taken (21%)</p>
<p>Safety/Cleanliness: Deboarding Area (15%) Safety from crime after getting off the bus (36%) Behavior of other people at the location (deboarding area) (34%) Cleanliness of the area (30%)</p>
<p>Safety/Cleanliness: Waiting Area/Vehicle (13%) Safety from crime while on the bus (24%) Behavior of other passengers (on vehicle) (24%) Cleanliness of area (20%) Safety from crime while waiting for the bus (17%) Behavior of other people at the location (15%)</p>
<p>Vehicle Attributes (11%) Smoothness of ride (25%) Seating comfort (19%) Ease of getting on an off vehicle (19%) Availability of seats (14%) Availability of hand rails/grab bars (12%) Temperature inside vehicle (11%)</p>
<p>Vehicle Cleanliness (10%) Cleanliness of vehicle interior (56%) Cleanliness of vehicle exterior (44%)</p>
<p>Bus Signage and Boarding Procedures (9%) Ease of paying fare or purchasing tickets (30%) Ability to see bus coming (24%) Ease of making transfers from the location (23%) Visibility of route names and number on the outside of the vehicle (23%)</p>
<p>Shelters at Waiting Area (8%) Availability of schedule information (44%) Availability of seats or benches to sit on while waiting (30%) Availability of shelter (26%)</p>

TABLE 4 Factors and Their Weights for Total Sample and by Transit District, CSI Bus Study

Factors	Weights					
	Total Sample	MRTA	CTA	MCTO	SEPTA	TRI-MET
Driver	17 %	13 %	12 %	16 %	20 %	22 %
System Performance	17 %	7 %*	11 %	22 %	16 %	36 %
Safety/Cleanliness: Deboarding	15 %	18 %	14 %	15 %	14 %	8 %*
Safety Cleanliness: Waiting Area and Vehicle	13 %	11 %	11 %	20 %	3 %*	18 %
Vehicle Attributes	11 %	20 %	5 %*	9 %	19 %	0 %*
Vehicle Cleanliness	10 %	12 %	11 %	8 %*	4 %*	0 %*
Bus Signage and Boarding Procedures	9 %	4 %*	10 %	3 %*	11 %	4 %*
Shelters at Waiting Area	8 %	4 %*	17 %	0 %*	3 %*	9 %*
Total Sample	500	100	100	100	100	100

*Statistically calculated estimates of what weight would be if sample size were larger

TABLE 5 Overall Satisfaction Index and Factor Index Scores for Total Sample and by Transit District, CSI Bus Study

Factor	Index Scores						
	Maximum Scores*	Base Scores	MRTA	MCTO	TRI-MET	SEPTA	CTA
Overall Satisfaction	183	100	111	110	106	91	82
Driver	171	100	113	106	105	89	87
System Performance	183	100	112	111	106	92	78
Safety/Cleanliness: Deboarding Area	181	100	110	110	106	91	84
Safety/Cleanliness: Waiting Area, Vehicle	190	100	110	110	107	90	83
Vehicle Attributes	192	100	110	110	104	92	84
Vehicle Cleanliness	182	100	108	112	107	95	79
Bus Signage and Boarding Procedures	179	100	108	112	107	91	82
Shelters at Waiting Area	195	100	117	110	108	86	78

*Maximum score possible if each factor given an "Excellent" rating.

TABLE 6 Relationship Between Loyalty and Customer Satisfaction, CSI Bus Study

Loyalty Measures	Overall Customer Satisfaction Levels			
	Very Satisfied	Somewhat Satisfied	Neither Satisfied Nor Dissatisfied	Somewhat Dissatisfied/Very Dissatisfied
Likelihood To Recommend Service:				
Definitely	71 %	24 %	28 %	2 %
Probably	26 %	61 %	34 %	30 %
Might/Might Not	2 %	8 %	21 %	28 %
Probably Not	1 %	5 %	9 %	17 %
Definitely Not	-	2 %	6 %	22 %
Likelihood To Use Service Again:				
Definitely	75 %	55 %	55 %	37 %
Probably	22 %	34 %	28 %	39 %
Might/Might Not	3 %	8 %	13 %	7 %
Probably Not	1 %	3 %	2 %	13 %
Definitely Not	-	1 %	2 %	4 %
Total Sample (500)	221	185	47	46

TABLE 7 Top Satisfaction Discriminators Between “Somewhat Satisfied” and “Very Satisfied” Customers, CSI Bus Study

	Attribute	Factor
1	Courtesy of driver	Driver
2	Availability of seats	Vehicle Attributes
3	Safety from crime after getting off the bus	Safety-Cleanliness (Deboarding Area)
4	Ease of getting on/off the vehicle	Vehicle Attributes
5	Service received for the fare paid	System Performance
6	Frequency of service	System Performance
7	On-time performance	System Performance
8	Knowledge of driver about system, routes and schedules	Driver
9	Cleanliness of vehicle interior	Vehicle Cleanliness
10	Behavior of other people (deboarding area)	Safety/Cleanliness (Deboarding Area)
10	Seating comfort	Vehicle Attributes

TABLE 8 Top Satisfaction Discriminators Between “Neither Satisfied Nor Dissatisfied” and “Somewhat Satisfied” Customers, CSI Bus Study

	Attribute	Factor
1	Behavior of other people (deboarding area)	Safety-Cleanliness (Deboarding)
2	Service received for the fare paid	System Performance
3	Driving competence of driver	Driver
4	Smoothness of ride	Vehicle Attributes
5	Seating comfort	Vehicle Attributes
6	On-time performance	System Performance

TABLE 9 Top Satisfaction Discriminators Between “Somewhat Dissatisfied/Very Dissatisfied” and “Neither Satisfied Nor Dissatisfied” Customers, CSI Bus Study

	Attribute	Factor
1	Frequency of service	System Performance
2	Cleanliness of vehicle interior	Vehicle Cleanliness
3	Safety from crime while on the bus	Safety-Cleanliness (Waiting Area/Vehicle)
4	Behavior of other people at the location (waiting area)	Safety-Cleanliness (Waiting Area/Vehicle)
5	Knowledge of driver about system, routes, and schedules	Driver
6	Safety from crime while waiting for the bus	Safety-Cleanliness (Waiting Area/Vehicle)
7	Availability of seats or benches to sit on while waiting	Shelters at Waiting Area
8	Cleanliness of the area (deboarding area)	Safety/Cleanliness (Deboarding Area)

TABLE 10 Overall Customer Satisfaction Ratings, CSI Light Rail Study

Overall Customer Satisfaction Levels	Percentage of Respondents		
	Total Sample	SEPTA	TRI-MET
Very Satisfied (5)	53 %	31 %	74 %
Somewhat Satisfied (4)	30 %	40 %	20 %
Total Satisfied (4 & 5)	83 %	71 %	94 %
Neither Satisfied/ Dissatisfied (3)	9 %	17 %	3 %
Somewhat Dissatisfied (2)	6 %	10 %	2 %
Very Dissatisfied (1)	2 %	2 %	1 %
Total Dissatisfied (1 & 2)	8 %	12 %	3 %
Total Sample	200	100	100
Mean Attribute Scores	4.26	3.88	4.64

TABLE 11 Factor Structure, CSI Light Rail Study

Factor (Weights) and Attribute (Weights) Total 100%
<p>Vehicle Attributes (22%) Cleanliness of vehicle interior (16%) Smoothness of ride (15%) Availability of seats (14%) Cleanliness of vehicle exterior (11%) Ease of getting on and off the vehicle (11%) Availability of hand rails/grab bars (10%) Visibility of route names and number on the outside of the vehicle (9%) Seating comfort (8%) Temperature inside the vehicle (6%)</p>
<p>Safety (20%) Safety from crime while on the train (22%) Cleanliness of station: deboarding area (18%) Behavior of other passengers on train (16%) Safety from crime while waiting at the station: waiting area (13%) Safety from crime after getting off the train (13%) Behavior of other people at the train station: waiting area (0%)</p>
<p>System Performance (20%) Service received for the fare paid (23%) On-time performance (21%) Ease of making transfers from the station (21%) Frequency of service (14%) Travel time versus other modes of transportation you could have taken (12%) Availability of schedule information (9%)</p>
<p>Stations (15%) Line for purchasing tickets or paying fares (20%) Cleanliness of station: waiting area (19%) Availability of seating at the station (17%) Ease of purchasing tickets or paying fares (16%) Courtesy and helpfulness of station staff: deboarding area (15%) Courtesy and helpfulness of station staff: waiting area (13%)</p>
<p>Operator/Conductor (14%) Clarity and timeliness of stop announcements (29%) Driving competence of operator (25%) Courtesy of the operator/conductor (22%) Knowledge of the operator/conductor about the system, routes and schedules (13%) Personal appearance of the operator/conductor (11%)</p>
<p>Phone Access (9%) Access to pay phone: deboarding area (51%) Access to pay phone: waiting area (49%)</p>

TABLE 12 Factors and Their Weights for Total Sample and by Transit District, CSI Light Rail Study

Factors	Weights		
	Total Sample	SEPTA	TRI-MET
Vehicle Attributes	22 %	26 %	9 %
Safety	20 %	19 %	24 %
System Performance	20 %	11 %	31 %
Stations	15 %	1 %	13 %
Operator/Conductor	14 %	25 %	3 %*
Phone Access (Boarding/Deboarding Areas)	9 %	9 %*	13 %
Factor Total	100 %	100 %	100 %

*Statistically calculated estimates of what weight would be if sample size were larger

TABLE 13 Overall Satisfaction Index and Factor Index Scores for Total Sample and by Transit District, CSI Light Rail Study

Factor	Index Scores			
	Maximum Scores*	Base Scores	SEPTA	TRI-MET
OVERALL SATISFACTION	177	100	82	118
Vehicle Attributes	177	100	79	121
Safety	188	100	82	118
System Performance	171	100	81	119
Stations	181	100	77	123
Operator/Conductor	168	100	85	115
Phone Access (Boarding and Deboarding Areas)	174	100	92	108

*Maximum score possible if each factor given an "Excellent" rating.

TABLE 14 Relationship Between Loyalty and Customer Satisfaction, CSI Light Rail Study

Loyalty Measures	Overall Customer Satisfaction Levels			
	Very Satisfied	Somewhat Satisfied	Neither Satisfied Nor Dissatisfied	Somewhat Dissatisfied/Very Dissatisfied
Likelihood To Recommend Service:				
Definitely	82 %	37 %	10 %	13 %
Probably	16 %	48 %	55 %	20 %
Might/Might Not	2 %	12 %	30 %	27 %
Probably Not	-	2 %	5 %	20 %
Definitely Not	-	2 %	-	20 %
Likelihood To Use Service Again:				
Definitely	91 %	58 %	55 %	33 %
Probably	8 %	28 %	35 %	7 %
Might/Might Not	1 %	8 %	10 %	47 %
Probably Not	-	5 %	-	13 %
Definitely Not	-	-	-	-
Total Sample (200)	105	60	20	15

TABLE 15 Top Satisfaction Discriminators Between “Somewhat Satisfied” and “Very Satisfied” Customers, CSI Light Rail Study

	Attribute	Factor
1	Smoothness of ride	Vehicle Attributes
2	Cleanliness of vehicle interior	Vehicle Attributes
3	Cleanliness of vehicle exterior	Vehicle Attributes
4	Ease of making transfers from location	System Performance
5	Clarity/Timeliness of stop announcements	Operator/Conductor
6	Courtesy/helpfulness of station staff: deboarding area	Stations
7	Behavior of other people at the train station (deboarding area)	Safety
8	Behavior of other passengers on the train	Safety
9	Cleanliness of station: deboarding area	Safety
10	Cleanliness of station: waiting area	Stations

TABLE 16 Top Satisfaction Discriminators Between “Neither Satisfied Nor Dissatisfied” and “Somewhat Satisfied” Customers, CSI Light Rail Study

	Attribute	Factor
1	Line for purchasing tickets or paying fares	Stations
2	Availability of car parking spaces	Parking Availability
3	Temperature inside the vehicle	Vehicle Attributes
4	On-time performance	System Performance
5	Cleanliness of vehicle exterior	Vehicle Attributes
6	Availability of seats	Vehicle Attributes
7	Driving competence of operator/conductor	Operator/Conductor
8	Availability of hand rails/grab bars	Vehicle Attributes
9	Safety from crime while waiting at the station (waiting area)	Safety

TABLE 17 Top Satisfaction Discriminators Between “Somewhat Dissatisfied/Very Dissatisfied” and “Neither Satisfied Nor Dissatisfied” Customers, CSI Light Rail Study

	Attribute	Factor
1	Ease of making transfers from the station	System Performance
2	Behavior of other people at train station (deboarding area)	Safety
3	Behavior of other passengers on train	Safety
4	Courtesy of operator/conductor	Operator/Conductor
5	Behavior of other people at train station (waiting area)	Safety
6	Courtesy and helpfulness of station staff (deboarding area)	Stations

TABLE 18 Overall Customer Satisfaction Ratings, CSI Heavy Rail Study

Overall Customer Satisfaction Levels	Percentage of Respondents		
	Total Sample	SEPTA	CTA
Very Satisfied (5)	35 %	33 %	36 %
Somewhat Satisfied (4)	38 %	47 %	30 %
Total Satisfied (4 & 5)	73 %	80 %	66 %
Neither Satisfied/ Dissatisfied (3)	11 %	10 %	12 %
Somewhat Dissatisfied (2)	11 %	5 %	16 %
Very Dissatisfied (1)	5 %	5 %	6 %
Total Dissatisfied (1 & 2)	16 %	10 %	22 %
Total Sample	200	100	100
Mean Attribute Scores	3.86	3.98	3.74

TABLE 19 Factor Structure, CSI Heavy Rail Study

Factor (Weights) and Attribute (Weights) Total 100%
<p>System Performance (22%) Service received for the fare paid (32%) Travel time versus other modes of transportation you could have taken (26%) Frequency of service (25%) On-time performance (17%)</p>
<p>Operator/Conductor (20%) Courtesy of the operator/conductor (24%) Driving competence of the operator (20%) Knowledge of the operator/conductor about the system, routes and schedules (20%) Clarity and timeliness of stop announcements (19%) Personal appearance of the operator/conductor (17%)</p>
<p>Safety (18%) Cleanliness of station: waiting area (27%) Cleanliness of station: deboarding area (19%) Safety from crime while waiting at the station (20%) Courtesy/helpfulness of station staff: deboarding (19%) Safety from crime after getting off the train (15%) Safety from crime while on the train (0%)</p>
<p>Waiting Area At Station (13%) Courtesy and helpfulness of station staff: waiting area (28%) Ease of purchasing ticket or paying for fare (17%) Availability of seating at the station (17%) Line for purchasing tickets or paying fares (14%) Availability of schedule information (12%) Ease of making transfers from the station (12%)</p>
<p>Vehicle Attributes (10%) Seating comfort (21%) Cleanliness of vehicle interior (18%) Visibility of route names and numbers on the outside of the vehicle (15%) Smoothness of ride (14%) Cleanliness of vehicle exterior (11%) Availability of seats (11%) Ease of getting on and off the vehicle (10%) Availability of hand rails/grab bars (0%) Temperature inside vehicles (0%)</p>
<p>Passenger Behavior (9%) Behavior of other people at the train station: deboarding area (47%) Behavior of other people at the train station: waiting area (29%) Behavior of other passengers on train (24%)</p>
<p>Phone Access (8%) Access to pay phone: deboarding area (53%) Access to pay phone: waiting area (47%)</p>

TABLE 20 Factors and Their Weights for Total Sample and by Transit District, Heavy Rail CSI Study

Factors	Index Scores		
	Total Sample	SEPTA	CTA
System Performance	22 %	18 %	21 %
Operator/Conductor	20 %	30 %	15 %
Safety	18 %	15 %	17 %
Waiting Area at Station	13 %	16 %	5 %*
Vehicle Attributes	10 %	8 %*	12 %*
Passenger Behavior	9 %	10 %	9 %
Phone Access	8 %	0 %*	15 %
Factor Total	100 %	100 %	100 %

*Statistically calculated estimates of what weight would be if sample size were larger

TABLE 21 Relationship Between Loyalty and Customer Satisfaction, CSI Heavy Rail Study

Loyalty Measures	Overall Customer Satisfaction Levels			
	Very Satisfied	Somewhat Satisfied	Neither Satisfied Nor Dissatisfied	Somewhat Dissatisfied/Very Dissatisfied
Likelihood To Recommend Service:				
Definitely	70 %	29 %	18 %	20 %
Probably	26 %	51 %	36 %	19 %
Might/Might Not	4 %	13 %	32 %	38 %
Probably Not	-	4 %	5 %	10 %
Definitely Not	-	3 %	9 %	13 %
Likelihood To Use Service Again:				
Definitely	81 %	65 %	45 %	42 %
Probably	19 %	23 %	32 %	35 %
Might/Might Not	-	9 %	9 %	3 %
Probably Not	-	3 %	14 %	20 %
Definitely Not	-	-	-	-
Total Sample (200)	69	77	22	32

Table 22 Top Satisfaction Discriminators Between “Somewhat Satisfied” and “Very Satisfied” Customers, CSI Heavy Rail Study

	Attribute	Factor
1	Seating comfort	Vehicle Attributes
2	Service received for the fare paid	System Performance
3	Cleanliness of vehicle interior	Vehicle Attributes
4	Behavior of other people at the train station: deboarding area	Passenger Behavior
5	Cleanliness of stations: waiting area	Safety
6	Courtesy/helpfulness of stations staff: waiting area	Waiting Area at Station
7	Frequency of service	System Performance
8	Courtesy/helpfulness of stations staff: deboarding area	Safety
9	Cleanliness of vehicle exterior	Vehicle Attributes
10	Ease of making transfers from the station	Waiting Area at Station

TABLE 23 Top Satisfaction Discriminators Between “Neither Satisfied Nor Dissatisfied” and “Somewhat Satisfied” Customers, CSI Heavy Rail Study

	Attribute	Factor
1	Travel time versus other modes of transportation you could have taken	System Performance
2	Cleanliness of station (deboarding area)	Safety
3	Ease of getting on and off the vehicle	Vehicle Attributes
4	Access to a pay phone (deboarding area)	Phone Access
5	Availability of car parking spaces	Parking Availability

TABLE 24 Top Satisfaction Discriminators Between “Somewhat Dissatisfied/Very Dissatisfied” and “Neither Satisfied Nor Dissatisfied” Customers, CSI Heavy Rail Study

	Attribute	Factor
1	Courtesy of the operator/conductor	Operator/Conductor
2	Behavior of other people at train station (deboarding area)	Passenger Behavior
3	Courtesy and helpfulness of station staff (waiting area)	Waiting Area at Station
4	Service received for the fare paid	System Performance
5	Safety from crime while waiting at the station	Safety
6	Ease of purchasing tickets or paying fares	Waiting Area at Station
7	Line for purchasing tickets of paying fares	Waiting Area at Station
8	On-time performance	System Performance

APPENDIX C
MASS TRANSIT CUSTOMER SATISFACTION STUDY
QUESTIONNAIRE

Hello, I'm _____ with _____ an independent market research firm in _____. We are conducting a national survey on mass transportation ridership, and would like to speak with a person in your household who is over the age of 16 and has ridden the (INSERT APPROPRIATE CITY/SYSTEM LISTED BELOW) bus (FOR CHICAGO, PORTLAND, AND PHILADELPHIA INCLUDE and/or rail) system in the past month. Would that be you?

REFER TO CITY AND ENTIRE SYSTEM NAME THE FIRST TIME AND THEN (LETTERS) IN SUBSEQUENT REFERENCES

- Akron - Metro Regional Transit Authority (MRTA)
- Chicago - Chicago Transit Authority (CTA)
- Minneapolis/St. Paul - Metropolitan Council Transit Operations (now MCTO) -- (if asked, it was formerly the MTC)
- Philadelphia - South Eastern Pennsylvania Transportation Authority (SEPTA)
- Portland - Tri-County Metropolitan Transit District of Oregon (TRI-MET)

(IF "YES" CONTINUE WITH QUESTION 1, OTHERWISE, ASK IF SOMEONE ELSE QUALIFIES, ONCE CORRECT PERSON IS ON THE PHONE, REINTRODUCE YOURSELF)

1. We are interested in your use of the (INSERT CITY/SYSTEM) bus (FOR CHICAGO, PORTLAND, AND PHILADELPHIA INCLUDE and/or rail system).

In particular, how many days did you use the (INSERT CITY/SYSTEM AND CORRESPONDING MODE(S) BELOW FOR CITY) in the past month? (IF RESPONDENT IS UNSURE SAY, "Can I wait while you count?") (INSERT EXACT NUMBER(S), DO NOT ACCEPT A RANGE)

	Bus	Light Rail	Heavy Rail
Akron	_____		
Chicago	_____	Rail/Trains)	_____(CTA
Minneapolis	_____		
Philadelphia	_____	_____(Light Rail/	_____(Commu ter Rail

Portland _____ (Light Rail/
MAX) Trolley) /Subway
Elevated)

MASS TRANSIT CUSTOMER SATISFACTION STUDY

(IN CHICAGO, PHILADELPHIA, AND PORTLAND, CHECK QUOTA SHEET AND SELECT APPROPRIATE BUS OR RAIL QUOTA TO PURSUE BEFORE PROCEEDING WITH APPROPRIATE INTERVIEW. NOTE: PHILADELPHIA HAS BOTH HEAVY AND LIGHT RAIL, PORTLAND HAS LIGHT RAIL, AND CHICAGO HAS HEAVY RAIL. ALL AKRON AND MINNEAPOLIS INTERVIEWS ARE BUS ONLY)

2a. In the past month, did you ever consider using the (INSERT BUS/RAIL SYSTEM), but decide to drive an automobile or use some other form of transportation instead?

Yes (CONTINUE WITH Q.2b)

No (SKIP TO Q.3 FOR BUS, OR Q.5 FOR HEAVY OR LIGHT RAIL)

(DO NOT READ) Don't know

2b. On how many days in the past month did you consider using the (INSERT BUS/RAIL SYSTEM), but ended up using some other form of transportation?

(INSERT EXACT NUMBER, DO NOT ACCEPT A RANGE)

3a. Did your last trip on the (INSERT BUS/RAIL SYSTEM) require any transfers?

Yes (CONTINUE WITH Q.3b)

No (SKIP TO Q.4)

3b. How many transfers did your last trip require?

(INSERT EXACT NUMBER, DO NOT ACCEPT A RANGE)

4. Today, I would like to talk to you about your most recent (INSERT CITY AND BUS/RAIL SYSTEM SELECTED) ride only. Even if you last trip took more than one vehicle to reach your destination, please tell me about the very last (INSERT BUS/RAIL) you rode. First of all, to the nearest minute, how long would you say you were on the last (INSERT BUS/RAIL) you rode.

_____ Minutes_
(INSERT EXACT NUMBER, DO NOT ACCEPT A RANGE)

MASS TRANSIT CUSTOMER SATISFACTION STUDY

ASK Q.5 AMONG BUS ONLY

5. I would like to talk to you about the location where you began your last bus trip. Would you say **(READ STATEMENT)** is excellent, very good, good, fair, or poor? **(REPEAT FOR FIRST FOUR STATEMENTS, THEN JUST SAY: "How would you rate the (STATEMENT)?)**

ROTATE STATEMENTS WITHIN SECTIONS

- a. Safety from crime while waiting for the bus
- b. Cleanliness of the area
- c. Ability to see a bus coming
- d. Access to a pay phone
- e. Behavior of other people at the location
- f. Ease of making transfers from the location
- g. Availability of shelter
- h. Availability of schedule information
- i. Availability of seats or benches to sit on while waiting
- j. Availability of car parking spaces at the location
- k. Ease of paying fare or purchasing tickets

ASK Q.6 AMONG HEAVY OR LIGHT RAIL ONLY

6. I would like to talk to you about the **(INSERT CITY/RAIL SYSTEM)** rail station where you began your last train trip. Would you say the **(READ STATEMENT)** is excellent, very good, good, fair, or poor? **(REPEAT FOR FIRST FOUR STATEMENTS, THEN JUST SAY: "How would you rate the (STATEMENT)?)**

ROTATE STATEMENTS WITHIN SECTIONS

- a. Ease of making transfers from the station
- b. Availability of car parking spaces
- c. Ease of purchasing ticket or paying fares
- d. Line for purchasing tickets or paying fares
- e. Cleanliness of station
- f. Courtesy and helpfulness of station staff
- g. Availability of seating at the station
- h. Availability of schedule information
- i. Your safety from crime while waiting at the station
- j. Access to a pay phone
- k. Behavior of other people at the train station

MASS TRANSIT CUSTOMER SATISFACTION STUDY

ASK ALL

7. And the service on your last (**INSERT BUS, HEAVY, OR LIGHT RAIL**) trip, would you say the (**READ STATEMENT**) is excellent, very good, good, fair, or poor? (**REPEAT FOR FIRST FOUR STATEMENTS, THEN JUST SAY: "How would you rate the (STATEMENT)?"**)

ROTATE STATEMENTS WITHIN SECTION

- a. On-time performance
- b. Frequency of service
- c. Service received for the fare paid
- d. Travel time versus other modes of transportation you could have taken
- e. Behavior of other passengers
- f. Safety from crime while on (**INSERT BUS OR RAIL**)

8. And the driver/operator/conductor on your last (**INSERT BUS OR RAIL**) trip, would you say the (**READ STATEMENT**) is excellent, very good, good, fair, or poor? (**REPEAT FOR FIRST FOUR STATEMENTS, THEN JUST SAY: "How would you rate the (STATEMENT)?"**)

ROTATE STATEMENTS WITHIN SECTION

- a. Courtesy of the driver/operator/conductor
- b. Knowledge of the driver/operator/conductor about the system, routes, and schedules
- c. Clarity and timeliness of stop announcements
- d. Driving competence of driver/operator/conductor
- e. Personal appearance of the driver/operator/conductor

9. And the vehicle on the last (**INSERT BUS OR RAIL**) trip, would you say the (**READ STATEMENT**) is excellent, very good, good, fair, or poor? (**REPEAT FOR FIRST FOUR STATEMENTS, THEN JUST SAY: "How would you rate the (STATEMENT)?"**)

ROTATE STATEMENTS WITHIN SECTION

- a. Visibility of route names and number on the outside of the vehicle
- b. Cleanliness of vehicle exterior
- c. Cleanliness of vehicle interior
- d. Availability of seats
- e. Temperature inside the vehicle
- f. Smoothness of ride
- g. Seating comfort
- h. Availability of hand rails/grab bars
- i. Ease of getting on and off the vehicle

MASS TRANSIT CUSTOMER SATISFACTION STUDY

ASK Q.10 AMONG BUS ONLY, RAIL CUSTOMERS PROCEED TO Q.11

10. I would like to talk to you about the location where you ended your last bus trip. Would you say the (**READ STATEMENT**) is

excellent, very good, good, fair, or poor? **(REPEAT FOR FIRST FOUR STATEMENTS, THEN JUST SAY: "How would you rate the (STATEMENT)?)**

ROTATE STATEMENTS WITHIN SECTION

- a. Safety from crime after getting off the bus
- b. Cleanliness of the area
- c. Access to a pay phone
- d. Behavior of other people at the location

ASK Q.11 AMONG HEAVY OR LIGHT RAIL ONLY

11. I would like to talk to you about the **(INSERT CITY) (INSERT "Heavy Rail" or "Light Rail")** station where you went when you ended your last trip. Would you say the **(READ STATEMENT)** is excellent, very good, good, fair, or poor? **(REPEAT FOR FIRST FOUR STATEMENTS, THEN JUST SAY: "How would you rate the (STATEMENT)?)**

ROTATE STATEMENTS WITHIN SECTION

- a. Cleanliness of stations
- b. Courtesy and helpfulness of station staff
- c. Your safety from crime after getting off the train
- d. Access to a pay phone
- e. Behavior of other people at the train station

ASK ALL

12. Thinking of your last **(INSERT BUS OR RAIL)** trip, how satisfied are you with that experience ont he **(INSERT CITY AND BUS/RAIL SYSTEM)?** Would you say you are **(READ LIST AND MARK ONE ONLY)**

- Very satisfied
- Somewhat satisfied
- Neither satisfied nor dissatisfied
- Somewhat dissatisfied
- Very dissatisfied
- (DO NOT READ)** Don't know

MASS TRANSIT CUSTOMER SATISFACTION STUDY

13. Now I will be asking you to answer some questions based on your entire trip. That means, even if you took more than one **(INSERT BUS AND OR TRAIN WHERE APPROPRIATE)** to get to your destination. First, please tell me which of the following statements best describes why you rode the **(INSERT BUS/RAIL SYSTEM)** on that occasion. **(READ LIST, AND MARK ONE ONLY)**

I rode because I can't drive or don't know how
I rode because I don't have a car available
I don't have a car available because I prefer to take the bus
(INSERT OR RAIL IN CHICAGO, PHILADELPHIA, AND PORTLAND)

14. Where did your entire trip originally begin? **(READ LIST, MARK ONE ONLY)**

Home

Work

School

Shopping or errands

Visiting and recreation

Personal business

Other **(SPECIFY)** _____

15. Was your original starting point for your entire trip in a city, suburban, or rural area?

City

Suburban

Rural

(DO NOT READ) Don't Know

16. Was your final destination? **(READ LIST AND MARK ONE ONLY)**

Home

Work

School

Shopping or errands

Visiting and recreation

Personal business

Other **(SPECIFY)** _____

17. Was your final destination? **(READ LIST AND MARK ONE ONLY)**

City

Suburban

Rural

(DO NOT READ) Don't Know

MASS TRANSIT CUSTOMER SATISFACTION STUDY

18. To the nearest year, how long have you been using the **(INSERT CITY/BUS OR RAIL SYSTEM)**?

_____ **Years**

(INSERT EXACT NUMBER, DO NOT ACCEPT A RANGE)

19. How likely would you be to recommend the **(INSERT CITY/BUS OR RAIL SYSTEM)** to a family member, friend, or co-worker? Would you say you **(READ LIST AND MARK ONE ONLY)**

Definitely would recommend it

Probably would recommend it
Might or might not recommend it
Probably would not recommend it, or
Definitely would not recommend it
(DO NOT READ) Don't know

20. How likely will be to use **(INSERT CITY/BUS OR RAIL SYSTEM)**
in the future? Would you say you **(READ LIST AND MARK ONE ONLY)**

Definitely will
Probably will
Might or might not
Probably will not, or
Definitely will not
(DO NOT READ) Don't know

To change the subject....

21. Have you ever called **(INSERT TRANSIT DISTRICT, NOTE: IN CHICAGO SAY "REGIONAL TRANSPORTATION AUTHORITY (RTA) TRAVEL INFORMATION CENTER)** for information such as route schedules or fares?

Yes **(CONTINUE WITH Q.22)**
No **(SKIP TO Q.23)**
(DO NOT READ) Don't know

MASS TRANSIT CUSTOMER SATISFACTION STUDY

22. How would you rate the customer service you received when you called in terms of **(INSERT STATEMENT)** Would you say this is excellent, very good, good, fair, or poor?

- a. Courtesy of customer service representative
- b. Ability to get through to a representative
- c. Speed of response
- d. Accuracy of information received
- e. Timeliness of receiving information sent in the mail by customer service representatives

ASK ALL

DEMOGRAPHICS

Finally, I would like to ask you a few questions for classification purposes only.

23. To the nearest year, how long have you lived in this metropolitan area?

_____ **Years**
(INSERT EXACT NUMBER, DO NOT ACCEPT A RANGE)

24. Which of the following categories includes your age? **(READ LIST AND MARK ONE ONLY)**

- Under 18
- 18-29
- 30-39
- 40-49
- 50-59
- 60+

(ASK Q.25 IF RESPONDENT IS OVER 18 YEARS OF AGE, OTHERWISE, SKIP TO Q.26)

25. Which of the following categories best represents your household's total annual income before taxes in 1993? is it
(READ LIST AND MARK ONE ONLY)

- Under \$10,000
- \$10,000-under \$15,000
- \$15,000-under \$25,000
- \$25,000-under \$35,000
- \$35,000-under \$50,000
- \$50,000-under \$75,000
- \$75,000 or more
- (DO NOT READ) Refused
- (DO NOT READ) Don't know

26. Do you personally require the use of wheel chair or walker?

- Yes
- No

27. Do you have a vision impairment that disqualifies you from driving?

- Yes
- No

28. Record gender

- Male
- Female

THANK YOU FOR YOUR COOPERATION IN THIS IMPORTANT RESEARCH!!!

NAME: _____

ZIP CODE: _____

COUNTY: _____

TELEPHONE

#: _____