

Developing Customer-Based Measures of Overall Transportation Service Quality in Colorado: Quantitative and Qualitative Approaches

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Abstract

Measurement of customers' perceptions of service quality is crucial to successful service management. This article focuses on the measurement of service quality in Colorado's transportation system, including all transportation modes, transportation infrastructure issues, and special emphasis on public transportation in metropolitan areas. It discusses quantitative and qualitative approaches to transportation service quality measurement. The study also contrasts the results of quantitative and qualitative measurements and methodologies for assessing transportation service quality. Finally, the paper offers recommendations for the use of these methodologies by transportation planners, especially those operating in the public transportation sphere.

Introduction

Valid, accurate measurement of customers' quality perceptions (Smerk 1992) are important to successful implementation of the Intermodal Surface Transportation Efficiency Act (ISTEA). Service quality, in particular, has attracted attention and inspired academic research, resulting in generic measures of overall service quality (e.g., Bitner, Booms, and Tetreault 1990; Parasuraman, Zeithaml, and Berry 1988) and unique measures designed for specific industries (e.g., Pullen 1993 and Stank 1993). While some research has been conducted specific to airlines and logistics (e.g., Cunningham and Lee 1996; Young, Cunningham and Lee 1994a, 1994b, 1992; Hopkins, Strasser, Hopkins, and Foster 1993; Lee et al. 1993; Gourdin and Kloppenborg 1991), little research has been conducted on service quality transportation issues by public transportation planning agencies (Cunningham, Young, and Kroeter 1995, 1994).

This study represents complementary approaches to measuring transportation service quality in Colorado (Dunn, Seaker, and Waller 1994; Seaker, Waller, and Dunn 1993), which included a quantitative telephone survey; a qualitative, critical incident technique (CIT); and a focus group approach. The methodologies complemented each other (Campbell and Fiske 1959; Jick 1979). Research followed a hierarchical process. Specific measures were initially developed based on quantitative telephone survey pretests (Study 1), followed by CIT and focus group research (Study 2). The article explains the research procedure in detail. It also reports and compares findings from the two studies and discusses their implications for transportation planners.

Service Quality: Quantitative and Qualitative Approaches To Its Measurement

Quantitative Approach

Perceived service quality, viewed as a type of attitude or a long-run overall evaluation (Bitner 1990; Bolton and Drew 1991; Parasuraman et al. 1988), is formed on the basis of piecemeal evaluation of individual service attributes and features that are integrated to form an overall judgment. This assumption is the

basis for multi-attribute measures of service quality, such as the SERVQUAL model (Parasuraman et al. 1985, 1988, 1991), which utilizes 22 attitude scales to measure perceived quality of tangibles, reliability, responsiveness, assurance, and empathy.

Although SERVQUAL has gained popularity in measuring service quality in a wide spectrum of industries (e.g., Crompton and Mackay 1989; Fick and Ritchie 1991; Johnson, Dotson, and Dunlap 1988; Woodside, Frey, and Daly 1989; Young, Cunningham, and Lee 1994), it has limitations. SERVQUAL measures are essentially generic rather than industry-specific, and the model is built upon an assumption of multi-attribute evaluations; thus, it does not capture categorical product or a service judgments made on the basis of product cues or service incidents (Fiske and Pavelchak 1986; Sujun 1985).

Qualitative Approach

The best known qualitative method for assessing service quality is the critical incident technique (CIT) developed and refined by Bitner (Bitner et al. 1990; Bitner, Nyquist, and Booms 1985), which states that service providers should focus on "critical incidents" that make customers happy or unhappy.

Major weaknesses of qualitative technique are that the data are hard to analyze; are susceptible to subjective interpretations due to the unstructured, non-standardized nature of the technique; and are difficult to compare and obtain objective results (Weiss 1968).

Thus, for more valid and reliable data, both qualitative and quantitative measures were used (Campbell and Fiske 1959; Dunn, Seaker, and Waller 1994; Jick 1979; Seaker, Waller, and Dunn 1993) in these two studies of the overall transportation system, including private transportation, the transportation infrastructure, the public and private intercity transportation systems, and public transportation systems in metropolitan areas. In Study 1, service-specific measures were used in a survey setting, and in Study 2, data were collected through critical incident and focus group techniques. Each study is described and then results are compared.

Study 1: Survey Research

New measures were customized for this study. Transportation services issues in Colorado were identified via (1) literature search of current concepts and theories, (2) examination of other state Department of Transportation (DOT) activities, and (3) focus groups and personal interviews with public, metropolitan, and regional transportation officials and officials at the state level. These components led to the development of a questionnaire administered to individual households throughout the state.

Questionnaire Development

A preliminary questionnaire reflecting contemporary transportation issues was developed from a literature search of databases and publications. Other state DOTs were contacted about techniques for measuring public perceptions, and two 2-hour focus groups (14 participants each) and 14 personal interviews were conducted to solicit insights. Extensive efforts were maintained to ensure diversity in the individuals selected for this process.

After a series of pretests, preliminary results were presented to the members of the statewide transportation steering committee for review and comment, and the questionnaire was presented for suggestions. The questionnaire was further refined to a format that could be administered as a 10-minute telephone survey of overall satisfaction with the transportation system, evaluation of the quality and condition of the system, the importance of different transportation aspects and activities, funding priorities, input into the decisionmaking process, air quality issues, carpooling, and public transportation issues.

Sampling Frame

Colorado is partitioned into 15 transportation planning regions (see Table 1 for population and sample sizes in each region), and a sampling of 2,020 households (selected by a method that gave all telephone numbers, listed and unlisted, an equal chance of being included) were selected for the statewide telephone survey. Each of the 15 transportation planning regions was represented by a minimum of 100 responses, with metropolitan areas receiving a higher sampling. To ensure maximum control and data accuracy, the questionnaire was in-

Table 1
Population and Sample Sizes of the
15 Transportation Regions in Colorado

<i>Region</i>	<i>Population</i>	<i>Sample Size</i>	<i>Proportion of Population (%)</i>	<i>Prop. Weight</i>
1	399,311	200	0.050	1.224
2	1,859,008	500	0.027	2.280
3	238,542	120	0.050	1.219
4	123,051	100	0.081	0.755
5	93,145	100	0.107	0.571
6	61,924	100	0.161	0.380
7	48,770	100	0.205	0.299
8	52,891	100	0.189	0.324
9	62,091	100	0.161	0.381
10	58,550	100	0.171	0.359
11	83,451	100	0.120	0.512
12	40,988	100	0.244	0.251
13	101,354	100	0.099	0.621
14	51,544	100	0.194	0.316
15	19,774	100	0.506	0.121
Total	3,294,394	2,020	0.061	

corporated into a Computer Aided Telephone Interview (CATI) program. During the survey, repeated attempts were made to contact each of the individuals selected for inclusion in the study to minimize not-at-home sampling frame error.

Results

Results of the survey were organized by issues (overall satisfaction, quality and condition of the system, etc.). Data were analyzed based on adjusted and unadjusted means. For adjusted means, the proportionate weights were used to adjust for the sample size to population size of each of the regions. Adjusted means represented a sample balanced for the different populations within each

planning region. Unadjusted means represented a sample giving approximately equal weight to each planning region regardless of its population. However, the pattern of results based on adjusted means was almost identical to that based on unadjusted means. Thus, for presentation purposes, the results based on simple, unadjusted means will be discussed in this paper. Table 2 shows the mean ratings of various transportation service dimensions and issues.

Overall Satisfaction. The overall satisfaction of the public was measured on a 5-point Likert scale ranging from 1 = "strongly disagree" to 5 = "strongly agree." The respondents were asked to indicate the extent to which they agreed or disagreed with

Table 2
The Public's Ratings of Transportation Services and Issues: Means and Standard Deviations^a

<i>Transportation Services/Issues</i>	<i>Mean</i>	<i>(SD)</i>
Overall Satisfaction	2.98	(1.41)
Quality of the System		
Snow Removal	3.50	(1.14)
Convenience	3.34	(.98)
Safety	3.34	(.98)
Air Quality	3.10	(1.17)
Parking	2.96	(1.10)
Congestion	2.90	(1.12)
Planning & Design	2.89	(1.07)
Road Conditions	2.74	(1.01)
Repair & Maintenance	2.71	(1.10)
Importance of Activities		
Repair Roads	4.39	(.91)
Improve Air Quality	3.93	(1.32)
Synchronize Traffic Lights	3.87	(1.39)
Increase Incentives for Carpooling	3.60	(1.31)
Increase Capacity of Existing Highways	3.20	(1.31)
Develop New or Better Bus System	3.05	(1.45)
Develop New Light Rail Transit	3.01	(1.61)
Build Carpool Lanes on Major Highways	2.93	(1.48)
Funding Priorities		
Potholes	4.15	(.99)
Elderly/Persons w/ Disabilities Transp.	3.99	(.99)
Improve/Widen Existing Highways	3.70	(1.12)
Timed Stop Lights	3.47	(1.20)
Courtesy Patrols	3.38	(1.10)

^ameasured on 5-point Likert scales

Table 2 (cont.)

<i>Transportation Services/Issues</i>	<i>Mean</i>	<i>(SD)</i>
Funding Priorities (cont.)		
Expanded Bus Service	3.38	(1.19)
Snow Removal	3.36	(.96)
Sanding	3.30	(1.04)
Rail	3.27	(1.37)
Carpool Lanes	3.13	(1.26)
New Roads	3.02	(1.24)
Electronic Messages on Highway Signs	2.83	(1.25)
Input into Decisionmaking Process		
Would Like More Input	3.77	(1.17)
Local Officials Provide Opportunity to Express Opinion	3.23	(1.31)
Air Quality Issues		
Air Quality Greater Concern Than Congestion	3.69	(1.34)
Restrict Cars and Trucks That Pollute	3.56	(1.50)
Willing to Pay More for Cleaner Air	3.26	(1.54)
Drive Less Because of Air Pollution	2.66	(1.42)
Carpooling		
Increase Carpool Incentives (Importance)	3.60	(1.31)
Carpool Lanes (Spending)	3.13	(1.26)
Build Carpool Lanes (Importance)	2.93	(1.48)
Miscellaneous Issues		
Courtesy Patrols Are a Good Idea	4.27	(1.03)
All Motorcyclists Should be Required to Wear Helmets	4.00	(1.53)
Usually Do Not Feel Safe Riding a Bus	2.94	(1.52)

the statement, "I am satisfied with the level of transportation services in our state." Overall, the average response to the survey suggested that the public was evenly divided into two groups of satisfied and dissatisfied respondents. The average response was 2.98. The public was almost evenly divided on its level of satisfaction with transportation services in the state. More than 49 percent of respondents indicated they were satisfied with the level of service, while about 44 percent indicated they were dissatisfied. Only a small number of respondents were undecided on the issue.

Quality of the System. One of the major purposes of the survey was to evaluate the public's view of the current condition of the

state's transportation services. A series of questions asked the public to evaluate the quality of various aspects of the state transportation services on 5-point scales (1 = "very poor"; 5 = "excellent"). Most responses centered around neutral. However, some factors were rated as being higher in quality than others. Snow removal, convenience, and safety were rated as being somewhat above neutral. Air quality, parking, and congestion were rated close to neutral, and planning and design, road conditions, and repair/maintenance were rated slightly below neutral.

Importance of Activities. This section of the questionnaire determined the relative importance of transportation service activities. The respondents rated the importance of those activities on 5-point scales from 1 = "not important" to 5 = "very important." Based on statewide averages, the public rated repairing roads, improving air quality, synchronizing traffic lights, increasing incentives for carpooling, and increased capacity of existing highways as above average in importance. The remaining factors were rated to be of average importance. A strong consensus was demonstrated for the repair and maintenance of roads as the state's chief priority. A substantial majority (61.2 percent) felt that this was very important to the state's agenda.

"Develop new or better bus system" and "develop new light rail transit" both received higher importance ratings than "build carpool lanes on major highways." However, respondents rated "increase capacity of existing highways" higher than the public transportation alternatives.

Funding Priorities. Funding priority questions were essential to finding out the needs and wants of system users. The questions in the previous section asked respondents to rate the importance of certain activities. The questions in this section asked respondents to indicate their opinions about various services on 5-point scales (1 = "decrease"; 3 = "maintain at current levels"; 5 = "increase spending"). The public was most likely to support increased spending on pothole repair across the state. This was consistent with the importance of repairing roads in the previous section of the survey. A majority of the respondents (76.1 percent) indicated that spending should be increased for pothole repair. Transporta-

tion for the elderly or persons with disabilities received the next highest spending increase. Agreement on this issue was widespread among the respondents. Improving/widening existing roads and timing stop lights were activities that also received increased funding support. All activities except electronic messages on highway signs were rated to merit increased levels of spending.

Considering the public transportation alternatives in funding priorities, the public was somewhat favorable towards expanding bus and rail services. The importance for these alternatives was higher than respondents' evaluation for new roads and/or carpool lanes.

Input into Decisionmaking Process. Two questions on the survey dealt with the public's input into the transportation service planning process. Specifically, the public responded on a 5-point Likert scale (1 = "strongly disagree"; 5 = "strongly agree") to the statements, "I would like to have more input into transportation decisionmaking than I currently do," and "Local officials provide an opportunity for me to express my opinions about transportation issues." On the average, respondents indicated that local officials provided adequate opportunities for them to express their opinions about transportation issues. However, respondents also said they would like to have more input into the process.

Air Quality Issues. A number of questions dealt with how the public perceived air quality. Respondents seemed to be willing to pay for cleaner air, although there were substantial differences of opinions among respondents. However, respondents indicated a slight unwillingness to drive less because of air pollution.

Carpooling. As previously shown in the sections on important activities and funding priorities of activities and services, there was support for increasing carpool incentives. However, building carpool lanes was not viewed as an important activity, and respondents were only moderately in favor of increasing public spending on this item.

Miscellaneous Issues. In addition to the major categories of findings, other items related to the public transportation services were investigated. In response to the statement, "Courtesy patrols that remove stalled vehicles are a good idea

to reduce traffic back-ups," the average rating was 4.27, and 54.4 percent responded with 5, "strongly agree." However, the section on spending priorities showed courtesy patrols might be an extra amenity people would like to have if more basic activities were accomplished first. Regarding their safety when riding on a bus, respondents, on average, slightly disagreed with the premise, "I usually do not feel safe riding on a bus"; the average rating was 2.94.

Study 2: Critical Incident and Focus Group Research

In the second phase of the research project, a series of respondent group meetings was conducted in each of the state's 15 transportation planning regions. The purpose of these gatherings was to meet with those who participated in the telephone survey and to explore significant findings in greater detail. In an informal group setting, respondents were asked about critical service incidents that made them satisfied or dissatisfied with the public transportation system, leading them to discuss other relevant issues. Thus, the methodology utilized in this study was a combination of the critical incident and focus group techniques.

Procedure

Respondents who were involved in the original telephone survey were invited to participate. Typically, the meetings lasted from 1.5 to 2 hours and were attended by 8 to 12 individuals who resided in the transportation planning region. The questions were derived from the responses to the previous survey and covered topics such as the ratings of transportation service quality, system satisfaction, funding priorities, decisionmaking input, air quality, carpooling, and so forth. At the meeting, participants were presented with regional survey results on these and other topics and asked if they agreed or disagreed with the regional results. The members of the group were asked to explain the regional responses and asked if the responses seemed significantly different from what they would have expected. The purpose of these questions was to determine if the survey responses were valid and to find out why residents from a given region placed more emphasis on one issue over another.

Data Analysis

Because of the subjective nature of analyzing the critical incidents and the focus group proceedings, each of the meetings was evaluated and summarized by separate individuals, in an iterative process, to ensure reliability of ratings.

The results of each of the regional group proceedings was viewed by three members of the research team. Each evaluator then developed a list of key issues brought up in the meeting. From that list of key issues, a summary report of the meeting was prepared. After preparing the regional summary report, each of the three reviewers evaluated the summary of the other team members. The group then met to review the findings and to reconcile any discrepancies in the individual summaries. From this, a final report was prepared.

Results

Overall Satisfaction. One of the primary considerations in satisfaction was effective use of State resources. Participants were most satisfied when they saw the State identifying a problem, allocating resources, and implementing a solution quickly and effectively. A prime consideration was that the State should not have to readdress the same issue year after year; participants believed that doing the job right the first time would free up considerable amounts of transportation revenue and significantly reduce waste. Generally, respondents indicated they were satisfied with most aspects of the system, but were dissatisfied with a few specific items.

Quality of the System. Each group was asked to review the transportation system quality results of its regional survey and to comment on the results. In the telephone survey, residents were asked to rate the quality of items such as snow removal, parking, road conditions, planning and design, and convenience, to name a few. The overall agreement of focus group members with the ranking of important items from the survey was remarkable. Discussions of system quality tended to center around four major topics: repair and maintenance, congestion, air quality, and safety.

Reactions throughout the state favored much better repair and maintenance of the existing road system. The respondents suggested that less money would be

spent on repairs in the long run if more effort were spent on making repairs properly in the first place. Rather than taking the approach of making less expensive but shorter-lasting fixes to roads, participants indicated they would like to see repairs done right the first time, even if it increased short-term costs. The opinions on repair and maintenance were particularly strong in the more rural areas of the state.

Another issue that arose concerned how increased congestion was affecting the transportation system. Increased congestion was the primary reason for calls to widen and improve existing highways in the state. Congestion was viewed as a contributing factor to safety and air pollution problems. Such concerns about increasing congestion were expressed in the major urban areas as well as in smaller towns that were experiencing growth problems. It is interesting to note that building new roads was not seen as important.

Safety was also identified as a specific problem. While tied to proper maintenance and increasing congestion on the highways, safety was mentioned several times as a specific concern to system users. On a positive note, there was widespread support throughout the state for the quality of snow removal. With very few individual exceptions, focus groups in all the regions indicated that the state did a good job of clearing snow from the roads quickly and efficiently. The only concern raised was the contribution sanding made to air pollution problems.

Importance of Activities and Funding Priorities. Consistent with the survey results, group discussions suggested that the primary areas of public concern were maintaining and improving the existing highway system, better traffic light timing, and better transportation services for the elderly and persons with disabilities.

In the telephone survey, respondents were asked if they would like to see spending increase or decrease for various individual spending items. These items included performing pothole repair, providing transportation for the elderly and persons with disabilities, improving existing roads, building new roads, timing stoplights, providing courtesy patrols, expanding bus service, providing sanding

and snow removal, installing electronic highway signs, and installing carpool lanes. The result was a list of 11 areas in which respondents indicated funding should be increased. However, group discussions showed that, when presented with such a ranking of items to be given increased funding, residents would give much higher priority to the top two or three items on the list. Therefore, transportation planners should focus on the top few items on the list when evaluating a region's funding priorities.

In most regions, the top funding priorities were either improving/widening existing roads, providing transportation for the elderly and persons with disabilities, timing stoplights, or performing pothole repair. However, in many cases, when pressed to choose the spending alternatives that should receive priority, respondents rated pothole repair below the other top concerns in the region. Even though, ideally, they supported spending increase for many items, they knew they could not afford the new taxes necessary to increase funding for more than a few of the options. One exception to this general observation was the response from a few smaller locales. In these locales, conditions of most items were viewed as being so bad that residents wanted increased spending in nearly every area. The respondents from these locales did not indicate from where they thought additional revenue would be obtained to fund these large spending increases.

With the exception of pothole repair, the other major funding items remained as priorities upon further investigation. This was especially the case regarding increased spending for the elderly and persons with disabilities. The reason for the strong support was that people tended to view transportation for the elderly and persons with disabilities as an important service that should be made available by society. It should be noted, however, that citizens generally did not understand the real costs associated with making significant upgrades in the transportation system for the elderly and persons with disabilities.

Other items that were consistently viewed as being the top funding priorities were improving and widening existing highways and providing better traffic light timing. Improving existing highways was identified as a priority to allevi-

ate congestion and to improve safety conditions. Better timing of traffic lights was given priority because it was viewed as a low-cost solution that could be implemented quickly and easily to alleviate congestion problems.

In major metropolitan areas, in addition to strong support for spending for the elderly and persons with disabilities, one additional priority was increased funding for mass transit projects. In these areas, mass transit was viewed as one of the best ways to reduce congestion and mitigate existing or projected pollution problems.

Input into Decisionmaking Process. Citizens wanted more input in the decisionmaking process if they could be confident that their concerns would be heard. Many indicated a reluctance to get involved in the process because they felt their input would not be taken seriously by transportation officials. From the comments of discussion group members, the best way to increase the amount of public input into decisionmaking seems to be to ensure that people feel their participation in the process actually makes a difference. Rural areas felt left out of the planning process. Citizens in these parts of the state generally felt that State planners ignored their problems and that the State's transportation resources were allocated on an unfair basis. Feelings persisted that urban areas received an undue share of the State's transportation planning and funding resources.

In rural areas, there was a perception that decisionmakers on the state level were not really concerned with their problems and that too much attention was given to the major urban areas. This feeling was also widely held in an isolated area where the public felt disenfranchised from the political and decisionmaking process. There were also calls for the DOT to visit the rural areas of the state and solicit public input. People in such areas even suggested they would support a tax increase to station a DOT representative in the area.

Air Quality Issues. Air quality was often a significant issue during the group discussions. It was linked to concerns about growth, congestion, and support for mass transit. While the level of concern over air quality varied across the state, this issue was raised to some degree by all regions. The participants' judgment of the air quality throughout the state varied, depending on whether they resided in

urban or rural population centers. In the principal metropolitan areas, there was a strong feeling that mass transit needed to be more fully developed to prevent local air quality from deteriorating any further. In other urban areas, the perception was that air quality was not currently a problem. However, group members were very concerned that, as their areas grew, air quality would degrade significantly and problems would develop. These concerns were so strong that some participants from these areas supported increasing taxes to pay for air quality programs or improving mass transit to keep additional cars off the roads.

The residents of some of the more rural regions also cited air quality as a specific concern. They expressed strong concern that air quality would degrade as traffic and congestion increased with growth and increased tourism. Because air pollution was viewed as being on the increase in these regions, there was also support for increased taxes to pay for air quality improvements or emission inspection programs.

Carpooling. Consistent with the findings from the telephone survey, many participants supported the idea of carpooling as a way to alleviate congestion and pollution problems in the more crowded urban centers. However, the support for carpooling was less strong when addressing specific ways to get more people to use carpools regularly.

In the more rural areas of the state, the perceived benefits of carpooling did not outweigh the additional costs in terms of reduced freedom and personal flexibility. In the urban centers of the state, carpooling was seen as a viable way to reduce congestion problems and to help reduce vehicle emissions.

Most of the suggestions for carpooling incentives centered around tax breaks for businesses that encouraged their employees to use carpools or that provided carpool vans. There was much less support for the building of carpool lanes. Though specified lanes were viewed as an incentive to carpool, the high cost of their construction was the principal reason for the lack of support. This was especially true when the hard costs of building carpool lanes were compared with the less tangible benefits of increased carpooling.

Overall, respondents viewed the primary incentive for carpooling to be the savings in time and money it would provide to users in crowded traffic areas. They did not feel that other incentives would increase carpooling aside from the personal rewards of reduced vehicle costs and commute times.

Miscellaneous Issues. The following issues were also raised and discussed:

- *Bicycles and Highway Safety.* Many focus group members were concerned about the increasing number of bicycles on the state's highways. Citizens said the increased number of riders on roads with narrow shoulders posed a safety hazard to bicyclists and motorists alike.

- *Vehicle Safety Inspections.* Because safety was a strong concern in the state, there were suggestions that one way to improve highway safety would be to resume vehicle safety inspections.

- *Highway Rest Areas.* Concerns were expressed in several sessions about the need to improve the quality of the state's roadside rest areas. Poor maintenance and the need for additional rest stops were cited as concerns.

Public Transportation

The support for public transportation came in different forms, depending upon the region and context in which it was presented. In many areas of the state, there was strong support for increasing public transportation. Most of the support was generated by concerns over real or perceived air quality problems, increasing congestion, and the desire to provide adequate transportation services for the elderly and persons with disabilities.

The qualitative research revealed a lack of understanding about the cost of public transportation. In almost every case, the public significantly underestimated the cost of building and operating mass transit systems. This misperception about costs was particularly true regarding the costs of building rail-based mass transit systems. When faced with the choice of mass transit or new roads, the participants opted for mass transit.

Not only was there a misperception about the cost of rail-based mass transit systems, the participants also had little knowledge about the true cost of public

transportation for the elderly and persons with disabilities, both in metropolitan and rural regions of the state.

Light rail was a subject of many discussions in the areas close to the central metropolitan area of the state. In the focus groups, light rail was viewed as an important contributing solution to the journey-to-work problem in large and medium-sized metropolitan areas. While this method of travel was clearly supported and favored as an alternative, it was apparent that the participants had little understanding of the true development and operating costs of such an alternative. Light rail was viewed as the technological-based solution, complete with savings of time and money that technology brings.

Conclusions

This research employed a multi-step, multi-method approach to measuring customer perceptions of service quality in the transportation system. The results from the telephone survey (Study 1) and the qualitative research (Study 2) provide significant insights for transportation planners. They also confirm that quantitative and qualitative research techniques should be used in combination for a more accurate picture of customer perceptions and evaluations of service quality.

Study 2 found that the respondents' general level of knowledge about transportation systems might not always be as high as their level of interest in building or using such systems. The study also found that there was a substantial lack of understanding among the public regarding the State funding allocation process—where the funds for transportation came from or how they were allocated. There was a strong reluctance to pay additional taxes until it was clear that the money was not funding individual special projects.

Respondents in both studies indicate they would like to have more input into the transportation decisionmaking process. Transportation planners should consider educating the public on topics such as transportation technologies, building and operating costs, and funding processes. As the public is better educated on transportation issues, they are able better able to make meaningful input into

the decisionmaking process and, at the same time, take ownership in the overall process. Thus, transportation officials and decisionmakers should make every effort to identify and incorporate public needs and opinions into the planning processes. By using the methodologies developed in this research to measure and track transportation service quality, transportation officials can build a true customer-based system.

The combination of quantitative and qualitative research approaches offers public transportation planners the opportunity to better understand the nature of the support for mass transit and its relationship with public perceptions of congestion and air quality issues. It also allows planners to better understand the nature and strength of the support for alternative public transportation solutions. Armed with this information, public transportation planners can better develop strategies to make the public aware of public transportation alternatives, and also explain the costs and benefits provided by those alternatives. ❖

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