Case Study

5

Transfort

Fort Collins, Colorado

Compared to You

A 22-bus system operated by the City of Fort Collins, Colorado, Transfort serves a growing city of 92,000, surrounding communities and the Colorado State campus. Designed almost twenty years ago to serve two primary markets – university students and transit dependents – the system was designed to try to serve as many of the potential origin and destination points as possible.

> "The system was designed to serve the entire area from the prairies to the city center. You could get to almost anywhere in the Fort Collins area but not quickly or frequently, and that was the problem."
>
> *John Daggett, General Manager*

Though there were apparent shortcomings to this method, the system operated in its original configuration for approximately ten years. Ridership grew enough that the decision was made to make some major capital investments in the operation. As part of this program, a full-scale Transit Development Plan was undertaken. Until 1989, the system had conducted no market research and relied primarily on ridership counts and unsolicited passenger comments to determine what types of service modifications were necessary. The system's transit development plans were based on the same informal information, as well as normal political input.

Their Research Program: Taking a Look At the Entire Operation

The city decided to take a bottom-up look at the entire operation, including a major market research effort to look at what riders and nonriders wanted from the system. A multi-tiered research effort was conducted, including:

- **Traditional rider counts** and local metropolitan planning organization data.
- **An on-board origin and destination study** that also included basic questions about rider demographics and attitudes toward the system.
- **A large-scale rider / nonrider mail survey** including a stratified sample of both university students and residents. The mailing lists were developed from residents'

utility bill information and from a complete student mailing list provided by the university.

- **Secondary quantitative studies** of riders, nonriders, students and residents to explore areas of particular interest developed as part of the larger surveys.

- **Formal and "informal" focus groups** to investigate the service plan developed as a result of the quantitative survey work and transportation development process.

Results of the survey indicated that the system, with its existing structure, was missing a great deal of its potential market and overserving other areas. A fundamental error had been made in the original service plan in that it did not recognize the full market potential of the university both in terms of route and fare structure.

As a result of the research, major route scheduling and fare system revisions were undertaken to better serve the university, while focusing service resources in the rest of the system. Following implementation and revision of the services indicated in the research, ridership for the system increased 300 percent from Colorado State in the first year.

The new service focused service on areas where research had indicated significant demand, and consequently key market segments received significantly improved service while marginal service was eliminated.

Transfort remains committed to the application of research to its TDP process and marketing efforts. It is currently in the process of completing its next major revision to the TDP. Like its predecessor, the current plan is based on a variety of research efforts – the key component of which is a systemwide household mail survey.

This critical study based on a stratified sample of 4,000 households in Larimer County, the entire existing and potential service areas of the Transfort system, was designed to:

- Develop a complete picture of regional mode split for the area;

- Measure rider and nonrider attitudes about Transfort as well as other transportation alternatives;

- Determine attitudes toward possible transit agency restructuring;

- Determine trip purpose by mode;

- Assess auto ownership; and

- Catalogue rider / nonrider demographics.

Initial results from the survey are currently being incorporated into the TDP planning process.

Besides acting as an information base for Tranfort's TDP planning, the agency uses market research for special purpose studies, such as a recent survey of employees in an industrial area targeted by the regional metropolitan planning organization (MPO) for participation in a TDM program of traffic mitigation. Research showed that approximately five percent of the 10,000 employees would utilize Transfort service if it were offered. From this base, Transfort

set about convincing employers in the area that transit was an important part of the traffic mitigation effort. This led to the formation of a new program, where employers in the service area agreed to subsidize the marginal costs of new service to the area, while Transfort provides annual passes to the industrial area's employees. While now in the implementation phase, if the model is successful it will be applied to other employers throughout Transfort's service area.

> "Fort Collins is committed to meeting [the MPO's] goal. This means that Fortrans has to be very aggressive in searching out customers and finding new ways to serve them. This requires a good look at our existing research and the development of new tools to better identify new market opportunities."
>
> *John Daggett, General Manager*

Case Study

6

WMATA

Washington, DC

Compared to You

The Washington Metropolitan Area Transit Authority, known as WMATA to most of its service area residents, is a large multi-state, multi-modal system serving the nation's capital. When created, WMATA assumed the operations of the Washington, DC bus system and a number of suburban services in Maryland and Virginia. Over the last twenty years, the agency has demonstrated an impressive record of growth led by the development of its well-known METRORAIL rapid transit system. METRORAIL serves as the radial high-density core of the system, with extensions to points in Virginia and Maryland focusing on downtown Washington. In addition, the agency's METROBUS system runs over 1,400 buses on in-city routes, suburban commuter services and intra-suburb operations. Though the rail line serves as the principal trunk link for the system, buses actually carry more of WMATA's trips daily.

Over the last four to five years, growth in ridership has slowed and turned into a decline and METROBUS ridership fall-off leads this decline. Ridership attrition has been serious enough to have a significant negative impact on the budget. Moreover, it has begun to interfere with the agency's ability to fulfill its mission of providing a high quality, alternative transportation system for the Washington, DC area.

> "There are lots of things we just don't know about why and where our former riders have gone. This is a more significant problem on the METROBUS system than the rail."
>
> *Donna Murray, WMATA Research Analyst.*

The factors contributing to this erosion of patronage prompted the agency to take a new look at the way it provides and promotes its services. Key to this overview was the development of a solid, research-based, strategic plan.

Due to the complexity of WMATA's market, serving:

- Commuters heading for jobs in the Federal Government largely concentrated in Washington, but dispersing into the Virginia and Maryland suburbs;
- Commuters working in the private sector in Washington DC, Maryland and Virginia;
- A large student population;

- A population more transient than most; and

- A significant tourist / visitor market.

it was determined that any attempt to attack the attrition of existing riders was likely to require a variety of strategies. It was important to focus on features of the service that could be modified to retain existing riders first while at the same time attracting new riders – a primary goal of WMATA's senior management.

Their Research Program: Pioneers in Applying Market Research

WMATA has had a research program in place for some time and pioneered the application of market research to the development of marketing programs for the transit industry. Market research results have served as the basis for a number of promotional and fare policy decisions. In addition to a variety of special purpose studies conducted over the years to deal with specific problems, ranging from focus groups for advertising concept testing to large scale studies of the METRORAIL's signage and information system, WMATA has maintained a series of major tracking studies over an extended period of time, including:

- **On-Board Surveys:** Conducted every two years, these studies are designed to measure rider attitudes toward the system as well as usage patterns using a sample size of more than 2,000.

- **Attitude and Awareness Studies:** Conducted annually using telephone surveying with a random sample of service area residents, the surveys measure demographics, travel patterns and attitudes about WMATA service among both riders and nonriders. By including questions designed to identify ridership status and reasons for discontinued riding, WMATA has attempted to use these studies to identify reasons for ridership attrition.

- **Origin and Destination Studies:** WMATA has conducted a series of origin and destination studies since creation of the agency – some of which are large scale, system-wide efforts, while others have been targeted at specific services or service areas.

Due to the large investment made in the core system, a larger percentage of the research effort has been directed at studies related to the METRORAIL system. This has, however, left some holes in the understanding of the large METROBUS system market.

To more fully understand the issue of rider attrition and to develop a more comprehensive view of market opportunities, the authority undertook the **Service Based Market Development Study**, designed to break the WMATA market into three geographic segments: Maryland, Virginia and the District of Columbia. The study also separated travel markets to and from the various geographic markets as well as trips within each of the states and districts.

Before developing a telephone survey questionnaire, **ten focus groups** were conducted with representatives of each of the segmented geographic areas – in part to minimize the impacts of WMATA staff imposing pre-conceived ideas into the questionnaire development, but also to enhance the development of questions for each of the geographic subgroups. Further analysis indicated that these subgroups were not enough. As a result, the suburb-to-suburb element was further divided into two groups, allowing for testing of six service alternatives for suburb-to-suburb

commuting. Designed to address key importance / performance characteristics and the need for the availability of off-peak service, the completed **random household telephone survey** included 825 households in Maryland, 815 in Virginia, and 195 in the District of Columbia.

The results of this study have served as a catalyst for WMATA to not only examine its current operating premises, but also to work quickly to better define the attrition issue. Study results have already been incorporated into the agency's marketing and pass sales efforts and will soon be incorporated into the proposed METROBUS strategic plan.

Due in large part to the results from this study, the authority's on-board messages are aimed at reinforcing the decision to ride WMATA. In addition, the agency has been heavily promoting increased off-peak usage of the system by existing riders through special event promotions. To help develop new riders, the agency is utilizing a targeted media effort, including television aimed at the target groups identified by the research. A new resident program aimed at individuals who move into targeted METROBUS service areas targets potential riders.

> "The market segmentation information provided by recent research has become our bible."
>
> *Ralph Frisbee, Manager of Advertising.*

As a "next step" in providing detail as to the specifics of why riders are leaving the system and to provide more geographically specific micro-pictures of where market opportunities exist, WMATA has begun the **Rider Analysis Study**. Designed to provide a neighborhood, or community, snapshot of the METROBUS market – needed in large part because of its own demographic and geographic complexity – the study will:

- Study the performance of the existing service in each geographic area;
- Provide a basis to plan new services in a holistic way, i.e. scheduling, routing and marketing; and
- Deliver and evaluate service in a unified manner.

Preliminary results were not yet available, but it was believed the year would see a new and major emphasis on market research with the Rider Analysis Study and other studies budgeted at $300,000 for the year.

Case Study

7

Whatcom Transportation Authority

Bellingham, Washington

Compared to You

Established in the early 1980's, Whatcom Transportation Authority (WTA) serves Bellingham, Washington and surrounding Whatcom County. In 1995, WTA introduced a brand-new bus fleet to the public. With its accessible fleet of 31 buses and 32 vans, WTA's 140 employees serve a population of 140,000.

Their Research Program: An Integrated Part of the Public Transportation Plan

In 1992, WTA developed its first major comprehensive planning effort, the Public Transportation Plan (PTP).

WTA staff wanted the PTP to address a variety of issues ranging from accommodating future population and employment growth to addressing immediate needs relating to improving bus operations and upgrading the agency's fixed facilities. WTA also wanted to incorporate, as much as practical, the findings of a community survey to help "design" future improvements in the agency's service, facilities, and supporting programs. The results of the survey, described below, provided a basis for several "products" that the WTA is gradually implementing.

The research results based on a telephone survey of Whatcom County residents – riders and nonriders – indicated several areas on which the WTA could focus would address concerns and interests on the part of both riders and nonriders. These areas included:

- **Evening Service:** At the time of the survey, WTA operated Monday through Friday between 6:30 AM and 6:30 PM and on Saturdays between approximately 9:40 AM and 5:40 PM. The research indicated a strong interest in WTA extending its service hours to allow transit to access activities occurring in the evening. This sentiment was particularly strong on the part of students at Western Washington University (WWU) which provides a major generator of demand for public transportation services. The WTA began "Nightline Service" – operating in the evenings, Monday through Saturday, resulting in significant increases in overall ridership for WTA's services. This increase occurred at a time when the agency's overall increase in service hours had been marginal. Of particular note about the Nightline service is that it involves a single route that connects major generators in the WTA's service area. The ridership gains were therefore achieved without a wholesale extension of service hours involving the systems fixed route network.

- **Monthly and Quarterly Pass Program:** Until April 1995, WTA did not have a pass program available to the public. Quarterly Passes were available to qualified seniors and persons with disabilities. The market research effort indicated that both riders and nonriders were attracted to the concept of a monthly pass. Students at WWU were particularly interested in a pass program, given their frequent use of WTA service at various times of the day and days per week.

  Moreover, as part of follow-up focus groups held in 1994 to discuss potential fare changes, groups of riders and nonriders indicated strong support for the concept of a pass program for the general public. At those sessions, participants indicated particularly strong support for pass programs that would provide significant discounts over cash fares.

  Consequently, WTA instituted new pass programs effective April 1995. The programs were part of an overall package of fare changes including increases in cash fares. However, the inclusion of the pass program helped win approval of the program by the WTA Board of Directors as well as general acceptance by the community.

- **Need for More Direct Service:** Finally, one of the concerns raised through the market research was the need to reduce transit travel times on the bus. Consequently, a major "trunk" route was realigned to provide a quicker and more direct link between major generators. The area no longer served by the route was replaced with the Meridian Shuttle. Through a transfer, customers could access areas previously serviced by Routes 9A/B as well as new areas not previously served. The implementation of this new circulator service also resulted in overall higher ridership levels due to customers living in the area having more convenient access to major generators through a quick bus ride. This contrasts with a possible loss of ridership due to the need by some customers to take two bus trips versus the previous one-bus trip to reach their destination. The increases in ridership can be attributable to two major factors:

  1) Recognition from the market research results that providing more direct service along an important route serving multiple transit markets could have significant positive impacts on both current and potential new customers.

  2) Implementation of replacement service that not only maintained overall coverage in an area no longer served by the realigned route, but also provided access to areas previously not served by public transportation.

"We've had success using market research to determine the products people want, so we'll renew our research-to-service implementation process and continue developing WTA's services this new way."

Rick Gordon, Director of Service Development

Case Study

8

Denver RTD

Denver, Colorado

Compared to You

Serving a multi-county area of approximately 1.9 million residents, the Regional Transportation District (RTD) of Denver, Colorado has a 14 member Board of Directors with each member elected directly by voters in the agency's service area. Bus operations dominate the system in terms of riders and service, however in 1994 light rail service was inaugurated. In 1994, RTD's ridership was approximately 48.5 million-boardings. Over the past few years, ridership has been gradually increasing.

Their Research Program: A Unique Approach

The Research and Product section of the Scheduling, Research and Sales Department carry out market research activities at RTD. A mix of research activities has been underway including traditional rider and nonrider surveys of the community.

Customer Panel: Six years ago the RTD established a 15-member Customer Panel which meets four times per year. The initial panel consisted of bus riders while a second, effective 1995, consists of light rail riders. Members are recruited through the District's newsletter which is distributed on buses and LRT trains. No payment is provided to Customer Panel members. However, a monthly pass is provided to those attending each of the four meetings of the Panel. A meal is also provided to the members given the 5:30 PM to 7:30 PM meeting time. If a Panel member attends all four meetings, an annual transit pass is provided by the District. In choosing panel members, RTD looks for diversity among members in terms of such characteristics as demographics and types of service that are used (for example, commuter, local, etc.).

There is substantial interest by RTD customers in joining the Customer Panel. Over 500 applications were received for the most recent bus rider panel. Attendance at previous panels averaged around 90 percent. In its recruiting of panel members the Denver RTD identified upcoming topics that will be discussed by members. Panel members, however, also have an opportunity to bring up particular issues that may not have necessarily been raised by staff.

The Customer Panel has provided an opportunity for Denver RTD management to have a sounding board regarding a variety of issues facing the agency, including:

- Upgrading of agency services,
- Future direction for RTD's services, and
- Assessment of new LRT service.

Telephone Information Center: In some cases, there is a specific service-related item that the Panel can discuss with agency staff. One of these items included RTD's telephone information system. The quality of any transit agency's information system can be a major determining factor in influencing a customer's decision to use the service. The RTD Customer Panel that met in 1994 helped re-engineer RTD's telephone information center. The panel also helped evaluate options regarding the new telephone system.

With input provided by the 1994 Customer Panel, the District installed a telephone answering system that allowed customers to listen to service updates and learn about District products and services without having to go through an operator.

Future Service Development: The Customer Panel has also provided direction regarding RTD's efforts relating to future service development. As part of the District's "Decide the Ride" program, over 20 meetings with the community were carried out. In 1994 the panel provided RTD staff with guidance regarding potential transit scenarios that were being presented at these community meetings.

This approach to customer involvement in the planning process is a significant departure from methods that have been traditionally used by transit systems. These methods are characterized by having customers involved relatively late in the overall planning process, perhaps through community meetings on a draft service plan.

On-Board Survey: As a mechanism for conducting qualitative research, the Customer Panel has been used to help RTD conduct quantitative research. For example, in late 1994, panel members helped direct an on-board survey of LRT customers. The panel provided guidance regarding methods for distributing survey forms.

Through its Customer Panels, the Denver RTD provided a mechanism to obtain ongoing feedback from current customers regarding various programs underway by the District. This ongoing and inter-active relationship between RTD and representatives of its current customers provides an opportunity for customers to participate in transit decision-making. Of particular importance, from the perspective of market research, is the role of the Customer Panel in helping to carry out other market research efforts such as the survey of LRT patrons carried out in 1994.

The availability of an ongoing forum for obtaining customer input has provided a resource to the RTD in carrying out various decisions that will affect both current customers and future markets. Other, more quantitative market research efforts such as rider / nonrider surveys are also carried out by RTD. However, the Customer Panel provides a mechanism that is both ongoing and inter-active that complements other research efforts.

Input provided by the Customer Panel resulted in various programs being more sensitive to the needs and concerns of customers. The changes involved a variety of items ranging from reviewing changes to the telephone information services to reviewing long-range transit development scenarios that will be presented to the public.

Through the Customer Panels, RTD managers have used results to show that decisions are not just relying solely on staff judgment or professional opinions. Management felt that input provided by the panel and other research efforts resulted in a higher level of credibility for decisions regarding service and other changes that the agency may consider.

Case Study

9

Houston METRO

Houston, Texas

Compared to You

With more than 1,000 buses providing 60 million passenger trips, Metropolitan Transit Authority (METRO) in Houston, Texas is the tenth largest bus system in the United States. METRO's goal is to provide alternatives to single-occupant automobile travel that will relieve traffic congestion and air pollution. The agency is organized by two main functions: 1) Capital Projects and Traffic Management; and 2) Transit Services.

Their Research Program: Research for Decision-Making

In 1990, METRO instituted a market research function to develop, test and evaluate marketing concepts and campaigns. The function was recently expanded to include the development of new services by listening to residents. The Market & Service Research, Analysis and Evaluation Division is in the Service Development Department, one of four Transit Services departments. (The other three departments are Marketing and External Affairs, Transit Operations, and Maintenance.) The division is headed by Mark Douglas and staffed by three analysts who are guided by the following:

> The goal of the Market and Service Research, Analysis and Evaluation division is to collect, analyze and present data in a meaningful and user-friendly manner to serve as a basis for informed, market-driven decision-making for the development of service; service expansion, adjustment and contraction; marketing and other authority activities that require a data based analytical framework.

Three types of market research activities are:

1) Front-end research to identify market needs and develop products and services;

2) Mid-cycle measurements to quantify ridership, track trends and assess service performance;

3) Back-end evaluation of marketing and other efforts.

Examples of recent studies include the following:

- **1993 Rider Attrition Assessment**. To address ridership declines, 5,000 households were contacted by telephone. The survey revealed that most former riders changed from riding METRO to driving because they bought a car or now work at a location METRO does not serve. Recommendations resulting from the study included: 1) a direct mailing which focused on convenient, on-time service to park-and-ride lots and offered free-ride coupons; 2) encouragement of current users to ride more often and for other purposes; 3) development of services to meet the needs of non-CBD bound residents.

- **Communications Tracking Survey**. About 800 quarterly telephone interviews measure awareness of METRO's advertising, news stories and functions. Respondents rate METRO's performance, image, and effectiveness.

- **Downtown Retail Impact Study**. To evaluate METRO's impact on the downtown area and gauge support for alternative transit center proposals, interviews of about 200 retailers and leasing agents were conducted.

- **Downtown METRO Rider Survey**. In-person interviews were conducted with 1,500 riders in downtown Houston to discuss plans for a new, centrally located transit terminal versus three centers just outside the downtown area. Respondents described the impact of each plan on their bus use; outlined transit center amenities they prefer; and estimated the amount of money they spend in the downtown area. Management and board members used the results to evaluate transit center options.

Several studies have focused on special routes or target audiences:

- **People with Disabilities Leadership Interviews**. Riding information materials were distributed to directors of service organizations, who were then interviewed by telephone. Recommendations from the survey included expanding the target of METROLift information from mainly physically disabled people to those with other disabilities; and sensitivity training for operators and staff.

- **Alternative Transportation Study, Greenspoint Employees**. METRO was considering expanding service to the Greenspoint Management District. Employees completed nearly 3,000 surveys about work schedules and transportation. Findings showed that 9 in 10 respondents drive alone to work; that parking is subsidized for 98 percent of employees; and neither traffic nor parking are seen as problems. Actions recommended include distributing environmental educational materials; offering incentives for using alternative ways of commuting; and instituting disincentives such as parking fees to discourage driving alone.

Other surveys measured the effect of pricing programs on demand:

- **Tokens Campaign**. A portion of a Communications Tracking Survey of 800 households tested the effectiveness of television, radio and print advertising regarding tokens and other prepayment instruments. Results showed that the campaign resulted in a 66 percent increase in the awareness of the cost savings accrued through the use of passes, tickets and tokens. Token redemption nearly tripled during the advertising period.

- **Freedom Passport Program**. During a six-month demonstration, ADA-certified METROLift passengers could ride METRO's fixed route bus service free with a Freedom Passport. The goal was to convert patrons from door-to-door METROLift service to regular fixed route service. An evaluation survey showed that 13 percent of METROLift clients used the Freedom Passport and that the revenues lost by providing free rides were offset by the reduced subsidy. Movement of METROLift passengers to fixed-route service also created capacity for other METROLift users.

A systematic process to determine the most appropriate services to implement has evolved at METRO. The first step in this experimental process involves market research to determine the area's needs. New service development surveys are slated for this year. They include:

- **Experimental Service Feasibility Surveys** in trip origin neighborhoods that will test suburb-to-suburb commute services, nonstop transit center shuttles, high-speed expressway service, and demand-responsive and neighborhood-focused services.

- **METROVan/Subscription Service Demand Surveys** to determine the demand for new METRO products such as subscription service that responds to the shift in demand for transportation services to smaller employment pockets that could not support fixed-route service.

- **University Program Research** to test the appeal of programs at the University of Houston and Texas Southern University, such as adding a transportation fee to enrollment costs that would allow students to ride METRO at no additional fare.

- **Probationary Route Research** to analyze routes that are not meeting productivity goals. Riders will be surveyed to determine how service could better meet their needs.

Other planned surveys will define market segments; measure customer satisfaction; and assess the needs and attitudes of Hispanic and Asian residents.

Noteworthy elements contributing to the success METRO is experiencing in the use of market research include the following. First, all potential users of the research are involved so that research projects are designed to provide information for the decisions facing METRO. Second, success has been demonstrated over time. When research results were used to develop programs, the improved products and services were very popular with riders. Third, management realizes that the agency cannot be doing everything perfectly, and is willing to acknowledge both opportunities and problems. This results in "objective, not defensive research." Fourth, the organization, skill and philosophy of the market research department itself enable the production of solid, quality data. The individuals are skilled in transportation and market research techniques. Finally, the agency has committed significant resources to this function.

Case Study

10

Metro-North Commuter Railroad

New York, New York

Compared to You

Metro-North, an 800-car commuter rail operation providing 57 million rides in 1993, merited APTA's Outstanding Achievement Award last year. Since Metro-North was created 11 years ago to serve New York City and its suburbs in New York and Connecticut, it has overcome its inheritance of badly deteriorated infrastructure, old, poorly maintained equipment, and complex operational history. Metro-North's New Haven Line was once a part of the New York, New Haven and Hartford Railroad; its Hudson and Harlem Lines were part of the old New York Central Railroad; and its Port Jervis and Pascack Valley Services were part of the Erie Lackawana Railroad operations. These railroads went through a series of consolidations that resulted in the creation of the Penn Central Railroad. The Penn Central and Erie-Lackawana later collapsed in one of the largest bankruptcies in U.S. history. With federal government assistance, Conrail was created to salvage the vital Northeast rail network, but the focus of Conrail was on major capital improvements and freight service. Never a moneymaker, commuter rail was left to deteriorate.

Public perception and ridership suffered. This led state leadership to commit to rebuilding the rail, replacing and adding equipment, and doing things differently than in the past. A member of the Metropolitan Transportation Authority (MTA) of New York (the umbrella agency for the Long Island Railroad, New York City Transit Authority with 8,000 subway cars and 2,200 buses, and the Triborough Bridge and Tunnel Authority), Metro-North now has steadily growing ridership, and dramatically improved maintenance, operations and customer service.

From 1983 to 1993, the fare-operating ratio increased from 37 percent to 54 percent and the operating subsidy decreased $25 million. On-time performance went from 80 percent to 96 percent and ridership increased by 11 million annual rides.

Their Research Program: A Part of Their Culture

Services are provided based on what the public wants rather than operational convenience or a history of having "always done it this way." Having gone beyond being customer-driven, this *market-driven* research strategy is basic to Metro-North's and MTA's philosophy. Rider and nonrider research is coordinated between the agencies; Metro-North also has its own market research department.

Planning, development, marketing and market research are viewed as the same function, headed by Vice President of Planning and Development Howard Permut.

> "In the beginning, market research meant developing a passenger counting system. There was no history of how many people were on the train or riding between specific station pairs. The main effort then was to determine scheduling needs, in order to avoid misallocations of equipment and employee hours. Now Metro-North can identify rider trends on any train or station in the system."
>
> *Howard Permut, Vice President of Planning and Development*

In the beginning, no customer satisfaction research was needed because in general, service was terrible. As service improved, more sophisticated research was developed over time. The next efforts were on-board studies that revealed the demographic characteristics of passengers, origin/destination information, and passenger ratings of performance, equipment and customer service.

As performance and customer confidence improved, Metro-North determined that pushing for ridership growth would require developing and understanding *new* customers. Thus, surveys of nonriders were begun. These now identify nonriders' demographic and commuting characteristics, attitudes toward Metro-North service, market share, new products, promotional messages, target audiences, and the effectiveness of new programs.

Metro-North President Donald Nelson sets the tone for integrating market research into the entire operation.

> "Market research is part of our culture. I want the best research and analysis I can get before I make any important decisions."

Operations staff members agreed:

> "We really use this stuff. Market research results are frequently brought to the board level as evaluation tools and the basis for future plans."

Research methods vary according to the kinds of information needed. Regular tracking surveys include an **annual on-board customer satisfaction survey**, providing ratings of some 50 service attributes, plus passengers' fare payment methods, origin/destination and demographic information (about 6,000 respondents), and **twice-a-year rider/nonrider tracking surveys** to measure advertising awareness, attitudes and demographic information, travel patterns and market share (about 2,000 respondents). Agreement statements describing Metro-North's service versus driving are featured in the studies.

Follow-up work such as **on-board focus groups** are used for more information on customer satisfaction (or dissatisfaction). Often, operations, maintenance and mechanical staff view the focus groups in action and find the experience valuable in implementing the changes suggested by the groups. While Metro-North serves some of the most affluent suburbs of New York, it was a surprise, for example, to find that the upscale commuters expected airline-type

facilities. Consequently, the agency now has an extensive program to upgrade passenger amenities in order to provide what the market wants.

Focus groups to test advertising creative concepts were used in 1992 to judge two different approaches to television commercials. Advertising showing the benefits of and reasons for choosing commuter rail were compared with ads portraying friendly, caring Metro-North employees. Because the employee spots appealed to the target markets more, Metro-North approved them for development.

A 1991 survey resulted from origin / destination studies showing a trend toward reverse and intermediate commute trips. The **"Increasing Ridership to Suburban Job Locations"** study combined existing employment data, intercept rider interviews conducted at the station platforms, and interviews with employees and top management at suburban job sites to determine what could be done to better serve this reverse commute market.

Metro-North is proud of its ability to track long-range trends and spot problems with a solid history of data, and will continue its regular six- and twelve-month studies. Specialized studies are likely to evolve from issues raised in the major tracking surveys or to address specific management questions. Additional planned market research relates to parking at the stations, reverse and intra-suburban commute trips, and new product development, such as revenue producing on-board services (breakfast carts or computers) and opportunities at the stations.

The use of market research is integral to attracting and keeping customers. The efforts are successful because rider / nonrider research results are requested and used throughout the organization.

> "At Metro-North, we feel it's the role of market research to determine what our customers and potential customers want, and for our planning and operations departments to do whatever it takes to provide those services."
>
> *Metro-North President, Donald Nelson*

Case Study

11

Orange-Seminole-Osceola Transportation Authority

(LYNX) Orlando, Florida

Compared to You

LYNX has increased ridership by 34 percent in the past eighteen months, in its Orlando, Florida service area of Orange, Seminole and Osceola Counties.

The all-bus system with only 140 vehicles serves a population of 1.2 million. That's about the same size population as Portland, Oregon's Tri-Met serves with a bus fleet that is five times bigger and also features a light rail system.

Formerly known as Tri-County Transit, it was run by a private company for about twenty years. Although the system was operated adequately, there were few community outreach efforts. Subsequently, there was little interest in the system. Often there was not even a quorum at transit board meetings.

Three years ago, the private contract ended and an active, influential community leader, Jacob Stuart, became chairman of the board. Under his leadership, the staff assumed responsibility for operations. New employees joined in.

Their Research Program: Being Prepared to Move Quickly

A strategic plan was needed and it was decided to base it on taking a fresh, open-minded look at the market. An initial survey of 1,200 households, personal interviews with forty community leaders, and three focus group studies were commissioned to:

1) Determine demographic, psychographic, and travel characteristics of current riders, potential riders, and staunch non-users;

2) Define market segments and their perceptions of incentives and deterrents to bus usage; and

3) Identify persuasive appeals and new services that would increase bus usage.

The report revealed that awareness was low. Few people could identify the system by name or knew much about the service. While respondents supported transit in general, support of this particular transit agency lagged. The agency received below average ratings on customer satisfaction, visibility, usage and market penetration.

Because of its sincere desire to effectively serve its markets, the new agency was interested in uncovering the truth so it could respond.

The research results were the foundation for the action oriented Master Plan. The first chapter of the plan summarizes the findings from the initial market surveys. The plan was built on what LYNX learned in studying its markets. To LYNX, everyone is a customer – those who ride and those who don't, the board, the community, businesses and visitors.

The first objective was to raise the awareness of transit and attract attention. A new name for the organization was the subject of a three-county contest in which 12,000 entries were received. The downtown transit center was painted a bright flamingo pink. Today, LYNX buses come in all sorts of colors. There is even a plaid articulated bus. Advertising "paints" include the entire bus. One bus looks like a giant pizza delivery truck; another is bright red (including the windows) with a soccer player across the side, advertising Orlando's World Cup soccer games.

Market research at LYNX is used daily and continuously for a variety of decisions. They use the community survey information every time they make a public presentation or in any discussion with a community group. LYNX is also doing a system-wide onboard survey to contribute information for the regional travel-forecasting model.

The major, ongoing research effort is the Service Evaluation Review Committee (SERC) studies, done in response to a request for service. LYNX staff does small-area, onboard surveys near the location of the service request. They take laptop computers onboard the buses and directly input the questionnaire responses; special software provides results almost instantaneously.

LYNX also uses the **on-board surveys** on a spot basis to address specific service questions. They rapidly gather the information, combine it with other information about the area, determine if a new service idea has merit, and quickly institute the service change at the next sign-up. If it works, the service continues; if not, it is dropped at the next regular service change.

The ability to cut through much of the red tape commonly associated with public agencies and start new service in a very short time shows an enthusiastic, customer-driven approach. The research establishes credibility for the sometimes revolutionary changes that the board is requested to approve. It isn't just staff, but the community who is asking for the changes.

LYNX reacts quickly and implements new ideas so rapidly, there may not be enough time for research. "Market research is fine, but often you don't have time to wait," declared one manager. In these cases, LYNX is apt to try things and then find out what happens.

The results have been very good. Although not much research was done in relation to advertising, LYNX tried a frequent-flyer type of program. People got a card, and when it was punched forty times, they received an umbrella. Staff expected participation of 2,000 to 3,000 people. The first recipient completed his card in two days, and so far they are up to 7,000 recipients and still counting. LYNX ran out of umbrellas several times and now knows to include the phrase, "while supplies last."

In response to the many smaller surveys and its commitment to making active contributions that improve people's quality of life, LYNX provides a useful and attractive set of transit services and takes an energetic community development role. For example, LYNX provides free transit for United Way volunteers and other community organizations. LYNX also helps in the management of traffic congestion and develops many cooperative promotions that benefit everyone.

While awareness and ridership are at an all-time high (about one million rides per month), LYNX serves a difficult area. *Orlando* magazine stated, "Orlando has been something of a poster child for urban sprawl over the past 25 years." (May, 1993) The market is very competitive. Besides the automobile and the extensive use of rental cars, there are over 200 private transportation providers in the Orlando area (plus the larger-than-LYNX Disney fleet).

Currently, there is no dedicated funding source, and this complicates long range planning and service provision. LYNX is popular and has been successful in obtaining sufficient support from the three counties it serves, but LYNX plans on a public vote at some point to secure a long-range funding source. In order to be successful, they have to prove to the community that this is a good investment and a worthwhile organization to support with tax funds.

The agency has made tremendous progress in only three years, based on using the results of its research, its community and customer-orientation, and open attitudes about trying new things (even though they may be unconventional). Given their record thus far and their skills at listening and responding to their customers, they appear positioned for continued increases in ridership and community acceptance.

Their successes in using research and trying new things are based on seven key attributes:

1) **LYNX is a market-driven organization, at all levels**. The word "retail" comes to mind when viewing their activities. They view themselves and their services as products to be sold to customers, and everyone is a customer. They compare their products to others in the marketplace and to other service providers.

2) There is a **fundamental belief in the value of research**, beginning at the top with the Chairman who comes from a background of political campaigns and polling. Market research about LYNX, their competition, and the marketplace is intrinsic to the way they do business.

3) Management and staff **understand the market research** information and uses it. They integrate data from various studies with their resources and insights to make good decisions.

4) LYNX is **willing to face the truth and do something** to address issues and problems raised in the research. Throughout the organization, they feel that if research is done well, then you accept the results (whether you like them or not) and use them to improve service.

5) LYNX has **very clear objectives for its market research**. They identify specific questions or needs for the data, then design a research effort to directly answer those particular needs.

6) The **agency acts very quickly**. They make changes almost on a daily basis. Their timely responses to customer input allow them to take advantage of market opportunities – much like successful private enterprise.

7) LYNX is **sincerely making an important contribution to the community** at large. Through its participation in many activities, sometimes quietly and anonymously, the region is a better place because of its transit system. There is a spirit of true community commitment beyond providing a good product at a reasonable cost.

LYNX has captured the imagination of the people it serves. People now look at transit in a new way, thanks to the standout transit center, brightly colored buses, aggressive promotions, many service improvements, and active community role LYNX has taken.

LYNX began by honestly focusing on what people wanted. To be fair though, having a neighbor like Disney opens creative avenues that may not be available to all transit systems who respond to research in their markets. Yet the key factors that make LYNX a successful, market-oriented organization apply to every service provider.

Case Study

12

King County Department Of Metropolitan Services

Seattle, Washington

Compared to You

Metro Transit serves 1.5 million people in King County, Washington, a 2,200 square mile area including Seattle and Bellevue. Since January 1993, the 13-member Metropolitan King County Council of directly elected officials who represent geographic districts has governed Metro.

Metro operates 1,200 coaches serving 58 million annual passenger trips, a two-mile monorail serving 2 million annual trips, a vanpool program serving 2.3 million annual passenger trips, and a custom bus program serving 300,000 annual trips. Metro's 3,800 employees include about 2,400 operators.

Their Research Program: Growing an Internal Research Function

In the 1970's, Metro began its marketing research function with a staff of one. At that time, Seattle was where the jobs were, and Metro's downtown Seattle-oriented system served the commuter market well. As outlying areas were developed, however, dispersed employment sites offered plenty of free parking. As more women entered the work force, the work trip increasingly included other trips, such as child transportation and grocery shopping. Drive-alone commuting and traffic congestion increased. By the mid-1980's, Metro's ridership had declined sharply.

In 1986, Metro formed a Research & Market Strategy Division (R&MS) by re-assigning planners, information staff, and a market research analyst, and hiring a new manager. A supervisor and three senior level researchers, none of whom had transit backgrounds, were also hired. Training programs in statistics and market research techniques were offered to the re-assigned transit employees, while the new hires spent time with operations, planning and other divisions to learn the transit business. The cross training led to a department staffed by people with strong transportation *and* market research skills. At the time, Metro management attributed the ridership decline to a failure of advertising and communication efforts rather than to changing customer transportation needs. Thus, Research & Market Strategy's main focus was on advertising, promotion and evaluation. Soon, however, the Division took on other roles that broadened its input into management decision-making – improving Metro's ridership forecasting and econometric models, collecting and maintaining data in support of federal reporting requirements, assistance with setting goals and objectives for Metro Transit Department's management strategy.

In 1989, management brought in R&MS for a purely internal research purpose – to design a Metro employee questionnaire. This was the beginning of a new, expanded role for the Division in providing internal research. It was also a key event in redefining "the customer" not only as the external public Metro serves, but the internal public of drivers, vehicle maintenance workers, and managers as well.

At first, management was skeptical of customer research and the researchers.

> "There was a growth period of acceptance of the Division. The lead members of the new Division didn't know about transit initially. Managers were skittish and used to doing things their own way."
>
> *Metro Manager, Research and Market Strategy*

Today both internally- and externally-focused customer research is central to the Transit Department. R&MS Division research and management consulting activities include: customer surveys, travel behavior studies, and public opinion research; operations research; econometric modeling and forecasting; focus group services through in-house facilities; evaluation research; information systems development, project management services for other divisions; problem solving; and management strategy development.

> "I put market research at the top in terms of usefulness. We need to know what the customer thinks to be successful."
>
> *Paul Toliver, Transit Director*

How did customer research go from skepticism to integration and usefulness at Metro Transit? By building trust, tracking customer perceptions over time, and having skilled staff to help the "internal customer."

- **Building trust**. Management identified trust as an important element in the success of customer research. R&MS earned a reputation for: (1) responsiveness, timeliness, accuracy and quality work products. "No one has to worry about them getting the job done or done right or it being done when they say it will be done and when the information is needed," said one manager; and (2) neutrality, objectivity, and non-threatening attitudes of researchers. "R&MS is neutral, objective, trusted, and people are comfortable with them," said another manager.

- **Tracking perceptions**. Tracking customer data over time has been valuable in establishing the validity of customer perceptions in the eyes of management. "Results, particularly those over time get repeated and it sinks in. People come to understand that their gut isn't always right," said one manager. "Part of (R&MS) success comes from showing consistent market research results over time. Consistent themes emerge and finally the point is made," added another manager.

- **Supporting the internal customer**. Assisting other divisions with problem solving, improving internal business practices, and organizational decision-making evolved over time as research staff training in the scientific method and problem solving became known in the Department. The R&MS Division has been very successful in this new, research-related role.

> "A main value of the division is being able to look at information objectively, problem solve with others, and facilitate what others are doing. This role has developed as others in the agency worked with the Division personnel over time."
>
> *Metro Manager*

The Research & Market Strategy Division offered suggestions for other transit agencies' research staff members to help integrate this function into their organization and its decision-making process:

1) **Build a reputation for high quality** research and a "can-do" attitude.

2) **Remain neutral and objective**.

3) **Be visible through outreach activities** within the organization, such as giving tailored presentations of findings to staff or board members and widely disseminating research results.

4) **Add to the value** of research by making it integral to other divisions. Examples include assisting the internal customer with employee surveys; developing performance indicators; facilitating team building efforts; developing employee performance appraisal systems; and finding ways to effectively summarize and display trends in internal data.

5) **Focus on helping others be more efficient**, save time or be more successful, rather than impressing others with one's expertise or knowledge of "the truth." As one manager said, "Help me be successful and I will come running. Tell me what to do and I'll run the other way."

6) **Recognize that building confidence and trust takes time** and be willing to stay the course.

Appendix

1

Notes and Resources

Resources

Books

David A. Aaker, Multivariate Analysis in Marketing: Theory & Application (Belmont: Wadsworth Publishing Company, Inc., 1971).

David A. Aaker, V. Kumar, and George S. Day, Marketing Research Fifth Edition (New York: John Wiley & Sons, 1995).

Pamela L. Alreck and Robert B. Settle, Survey Research Handbook Second Edition (Chicago: Irwin, 1995).

Vincent P. Barabba and Gerald Zaltman, Hearing the Voice of the Market (Boston: Harvard Business School Press, 1991).

Norman M. Bradburn and Seymour Sudman, Polls and Surveys (San Francisco: Jossey-Bass, 1988).

Gilbert Churchhill, Jr. Marketing Research: Methodological Foundations Sixth Edition (Chicago: Dryden Press, 1995).

Don A. Dillman, Mail and Telephone Surveys (New York: Wiley Interscience Publications, 1985).

Alan Dutka, AMA Handbook for Customer Satisfaction: A Complete Guide to Research, Planning, & Implementation (Lincolnwood: NTC Business Books, 1994).

R.M. Groves, Telephone Survey Methodology (New York: John Wiley & Sons, 1988).

Bob E. Hayes, Measuring Customer Satisfaction: Development and Use of Questionnaires (Milwaukee: ASQC Quality Press, 1992).

Leslis Kish, Survey Sampling (New York: John Wiley & Sons, 1965).

Peter H. Rossi, James D. Wright, and Andy B. Anderson, Handbook of Survey Research (San Diego: Academic Press, Inc., 1983).

Magazines

Journal of Consumer Research: An Interdisciplinary Quarterly. A quarterly publication of the Association for Consumer Research (Pasadena).

Journal of Marketing. A quarterly publication of the American Marketing Association (Chicago).

Journal of Marketing Research. A quarterly publication of the American Marketing Association (Chicago).

Marketing Research: A Magazine of Management & Applications. A quarterly business management publication of the American Marketing Association (Chicago).

Quirk's Marketing Research Review. Issued ten times a year by Quirk Enterprises, Inc. (Minneapolis).

Directories

The Blue Book: Research Services Directory. Marketing Research Association (Rocky Hill, CT).

The Green Book: International Directory of Marketing Research Companies and Services. American Marketing Association (New York).

The Focus Group Directory: International Directory of Marketing Research Companies and Services. American Marketing Association (New York).

The Markets Directory. Dobbs Directories (White Plains, NY).

Glossary

allowable sampling error	The amount of sampling error the researcher is willing to accept.
banner	A method for showing several cross-tabulations in one, condensed table in order to save space or facilitate comparison, ordinarily used only when one variable is cross-tabulated against several others.
bivariate regression analysis	Analysis of the strength of the linear relationship between two variables when one is considered the independent variable and the other the dependent variable.
callbacks	The second and subsequent attempts to contact respondents by telephone or in person when they were not present to respond to the first attempt to contact them.
central location telephone interviewing	Interviewers make calls from a centrally located marketing research facility to reach and interview respondents.
chi-square	A value, usually obtained from cross-tabulation of two items in survey research, that can be compared with the values of the chi-square distribution to obtain a probability for assessing statistical significance.
chi-square test	Test of the goodness of fit between the observed distribution and the expected distribution of a variable.
classification variables	Survey items, such as demographic variables, that are used to classify respondents into groups or categories for comparison.
closed-ended questions	A structured survey question where the alternative answers are listed so that respondents must ordinarily pick only from among them.
coefficient of determination (R2)	The percent of the total variation in the dependent variable explained by the independent variable.
computer assisted telephone interviewing	Central location telephone interviewing in which the interviewer enters answers directly into a computer.
conditional branching	Instructions or "go-to" statements in a questionnaire indicating the interviewer or respondent should skip items that don't apply, based on answers to previous questions.
confidence interval	The range around a numeric statistical value obtained from a sample, within which the actual, corresponding value for the population is likely to fall, at a given level of probability.
confidence level	The specific probability of obtaining some result from a sample if it did not exist in the population as a whole, at or below which the relationship will be regarded as statistically significant.
consumer orientation	Identification of and focus on the group of people or firms most likely to buy a product and production of a good or service that will meet their needs most effectively.
convenience sample	A sample selected more on the basis of the researcher or data collection team's convenience than on the requirements for random selection with a known probability of inclusion and representation.

corporate marketing research department	A department of a major firm that produce or oversee collection and analysis of information relevant to marketing the firm's present or future products or services.
critical value	The probability level above which a relationship between variables will not be regarded as statistically significant because it is too likely that it could result only by chance from sampling error if the variables were actually not related in the population as a whole.
cross-tabulation	Examination of the responses to one question relative to responses to one or more other questions by plotting two categorical variables in the form of a matrix so that the values of one variable define the rows and values of the other define the columns, with the cells containing the frequency of cases with a given value for each of the two items and from which a chi-square value can be computed to assess the statistical significance of the relationship.
data analysis	The manipulation of numbers, letters, or symbols in order to suppress the detail and reveal the relevant facts or relationships.
data collection	The process of communicating questions and obtaining a record of responses from a sample, either by mail, telephone, or personal interviewing.
demographics	A set of conditions or attributes of people, often including age, sex, marital status, education, employment, occupation, and income, among others, usually measured in surveys to determine the types of people represented by the sample and to make comparisons of other results among demographic groups.
dependent variable	A symbol or concept expected to be explained or caused by the independent variable.
depth interviews	One-on-one interviews that probe and elicit detailed answers to questions, often using non-directive techniques to uncover hidden motivations.
descriptive research	Research that is designed primarily to describe rather than to explain a set of conditions, characteristics, or attributes of people in a population, based on a measurement of a sample.
descriptive statistics	Statistics such as averages and measures of spread, used to suppress the detail in data files and to condense and summarize the data to make facts more visible, as well as to indicate the degree to which the sample data are likely to represent the entire population.
dichotomous questions	Questions that ask the respondent to choose between two answers.
discriminant analysis	A statistical measure of the relationship between a continuous, numeric independent variable from an interval or ratio scale and a categorical dependent variable defining two or more groups, used both to assess statistical significance and also to compute the discriminant function, used to predict or classify new cases into groups.
discussion guide	A written outline of topics to cover during a focus group discussion.
disproportional or optimal allocation	Sampling in which the number of elements taken from a given stratum is proportional to the relative size of the stratum and the standard deviation of the characteristic under consideration.
exploratory focus groups	Focus groups that aid in the precise definition of the problem, in pilot testing, or to generate hypotheses for testing or concepts for further research.
exploratory research	Preliminary research to clarify the exact nature of the problem to be solved.
field service firms	Companies that only collect survey data for corporate clients or research firms.

focus group facility	Facility consisting of conference or living room setting and a separate observation room. Facility also has audio visual recording equipment.
focus group moderator	The person hired by the client to lead the focus group. This person may need a background in psychology or sociology or, at least, marketing.
focus groups	Groups of eight to twelve participants who are led by a moderator in an in-depth discussion on one particular topic or concept.
go errors	An error that results when a decision-maker goes ahead with a course of action and it proves to be costly or unsatisfactory.
goals	Specific objectives or ends sought by respondents that may be a topic for survey research measurement within the broader topic category of "needs."
hypothesis	A conjectural statement about the value of some variable or the relationship between variables that will be tested and ultimately accepted or rejected on the basis of statistical analysis of survey results, most often used in formal scientific or academic research.
incidence rate	The percentage of people or households in the general population that fit the qualifications to be sampled.
independent variable	The symbol or concept over which the researcher has some control or can manipulate to some extent and that is hypothesized to cause or influence the dependent variable.
inferential statistics	Any statistical measure that can be used to make inferences or generalizations about a population, with a known level of probability, based on the values or conditions of a sample.
information needs	The specific categories of information required by those sponsoring pragmatic survey research, in order to make decisions or choices or to set policy, or required by those conducting academic research to test a theoretical or conceptual hypothesis and enhance some body of knowledge or literature.
instrumentation	The survey questionnaire and other devices, such as cover letters, rating cards, and the like, used to obtain data from respondents.
instrumentation bias	The tendency for some aspect of the survey instruments to cause respondents to answer in a particular way or systematically "push" or "pull" the survey results in some given direction, thus reducing the survey validity.
instrumentation error	The tendency for some aspect of the survey instruments to randomly affect the data in such a way that they are not true representations of the respondent opinions or conditions, but there is no specific direction or systematic influence , so that survey reliability is reduced.
interpretation error	Error that results when interviewers are asked to interpret responses during the interview or make judgments about the responses.
interrogation error	Errors that occur when questions are expressed differently from one respondent to the next.
interval scale	Any scale where the intervals between scale points are equal, even though there may be no zero value or zero does not represent a complete absence of the thing measured, such as the Fahrenheit scale.
interviewing bias	The tendency for some aspect of the interviewing to cause respondents to answer in a *particular way* or systematically "push" or "pull" the survey results in some given direction, thus reducing the survey *validity.*

interviewing error	The tendency for some aspect of the interviewing to randomly affect the data so they don't truly represent the respondents' opinions or conditions, thus reducing the survey *reliability.*
judgment sample	A sample selected on the basis of the researcher's judgment about what units or respondents should and should not be included, as opposed to random selection.
level of confidence	The specific probability of obtaining some result from a sample if it did not exist in the population as a whole, at or below which the relationship will be regarded as statistically significant.
multiple regression	Linear regression that uses a single dependent variable and two or more independent variables in the same analysis, in contrast to simple, linear regression using only one independent variable, so that both the effect of each independent variable and the effects of interactions among independent variables can be gauged.
multivariate analysis	Statistical analysis techniques to assess the relationships or patterns among more than two variables simultaneously, including such methods as multiple regression, factorial analysis of variance, analysis of covariance, factor analysis, cluster analysis, multidimensional scaling, and the like.
mutually exclusive categories	Response categories defined to ensure a unique association between any given answer and only one category or alternative, so no response can fit into two or more categories.
no-go errors	Errors that result when a decision-maker either fails to take some action that would have positive results, or ignores an alternative that would be more positive, choosing some less positive course.
nominal scale	A scale that uses numbers, letters, or symbols only as the names of independent categories, so that the scale values do not stand in any ordered relationship to one another.
nonrespondents	Those in the population who were included in the sample but failed to respond because they refused or could not be reached, or for some other reason.
nonresponse bias	A systematic effect on the data reducing validity that results when those with one type of opinion or condition fail to respond to a survey more often than do others with different opinions or conditions.
ordinal scale	A particular type of scale where the response alternatives define an ordered sequence, so the first is less than the second, the second less than the third, and so on, yielding ordinal level data where the intervals between scale points are not known or necessarily equal.
panel data collection	A survey of a group of preselected respondents who agreed to be panel members on a continuous basis for a given period of time and provided demographic data, allowing selection of special groups and permitting the use of surveys to monitor responses over time.
personal interview	Data collection accomplished with the interviewer in the presence of the respondent, so that they have visual contact, as opposed to telephone interviewing.
pilot survey	A brief preliminary survey, often using a small, convenience sample, conducted to test the survey instruments and data collection method before the project details are finalized and the larger, formal survey conducted.

population	The definition of all those people or elements of interest to the information seekers and from among whom the sample will be selected.
precision	The range of confidence interval at a given level of probability, expressed in absolute terms or as a percentage of the mean value.
preferences	Predetermined choices by respondents from among alternative goods, that may be a topic for survey research measurement within the broader topic category of "needs."
pretest	Preliminary trial of some or all aspects of the sampling design, survey instrumentation, and data collection method, to be sure there are no unanticipated difficulties or problems.
primary data	Data collected for a particular project to meet specific information needs, as opposed to data that already exist for general use or as the result of inquiries for other purposes.
probability sampling	Any sampling design where every element in the population has either an equal probability of selection, as with random sampling, or a given probability of being selected that is known in advance and used in analysis to assess significance.
qualification	The process of inspecting or interrogating potential respondents to be sure they are qualified to respond or that they fit the quota specifications for a particular interviewer.
qualitative research	Research obtaining data in the form of words or other indications that do not lend themselves to quantitative analysis and whose analysis and interpretation depend on subjective judgments by experts.
quantitative research	Research obtaining data in the form that can be represented by numbers, so that quantities and magnitudes can be measured, assessed, and interpreted with the use of mathematical or statistical manipulation.
questionnaire	The basic survey instrument containing instructions, questions, or items, response alternatives where appropriate, and specific means for recording responses.
quota	A set number or proportion of respondents with given characteristics or attributes sought in a sample or assigned to specific interviewers or fieldworkers.
quota sample	Any sampling design that requires a set number or proportion of respondents with given characteristics or attributes.
quota specification	The listing of quota requirements for the entire sample or for specific interviewers, including identification of the characteristics that define the quota, the manner in which they are to be ascertained, the method of qualification of respondents, and the number or proportion of respondents who are to have each attribute or combination of attributes.
random digit dialing	A sampling system for telephone surveys where all telephone numbers in-households or all that have one of a given set of three-digit telephone number prefixes are regarded as the sample frame, and the seven-digit or four-digit numbers are generated and dialed manually or automatically to obtain the sample.
random sampling	A sampling design that seeks to select respondents from the population or sample frame in a completely random fashion, so every respondent has an equal probability of being selected.
rating scale	Any scale from which respondents choose values that represent their responses, ordinarily yielding interval or ratio level data.

ratio scale	Any scale that has the same characteristics as an equal interval scale, plus the fact that zero represents the complete absence of the thing being measured, so that a ratio of one scale value to another has a meaningful and legitimate interpretation.
regression analysis (simple linear regression)	A statistical measure of the effect of one interval or ratio level variable on another, used both to indicate the statistical significance of the relationship and to generate an equation to predict or estimate the value of the dependent variable for a new case, based only on the known value of the independent variable.
regression equation	The equation generated by linear regression analysis, expressed as a coefficient that can be multiplied by the value of the independent variable for a new case and a constant to be added to predict the unknown value of the dependent variable.
reliability	The degree to which the survey results are free from random error, as opposed to systematic bias, often expressed in terms of confidence intervals or confidence levels. Also measures that are consistent from one administration to the next.
research design	The plan to be followed to answer the research objectives; the structure or framework to solve a specific problem.
research request	Document used in large organizations that describes a potential research project, its benefits to the organization, and estimated costs. A project cannot begin until the research request has been formally approved.
responding sample	The number of cases with valid responses to the survey or to an individual survey item, as opposed to the total sample size.
response bias	The tendency for some aspect of the response task, such as annoyance or a desire to please the interviewer, to cause respondents to answer in a particular way or systematically "push" or "pull" the survey results in some given direction, thus reducing survey validity.
response error	The tendency for some aspect of the response task, such as boredom, inattention, or fatigue, to randomly affect the data in such a way that they are not true representations of the respondent opinions or conditions, but there is no specific direction or systematic influence, so that survey reliability is reduced.
response rate	The percentage of those included in the sample who responded to the survey and provided usable, completed questionnaires.
sample selection bias	Any form of bias resulting from the selection of respondents in a manner that deviates from random selection, so that some types of respondents are over- or underrepresented in the sample.
sample unit	The smallest unit of the sample to be surveyed or the unit that will constitute one case for analysis, ordinarily one respondent or questionnaire.
sampling design	The specification of the sample frame, sample size, and the system for selecting and contacting individual respondents from the population.
sampling error	The degree to which results from the sample deviate from those that would be obtained from the entire population, because of random error in the selection of respondent and the corresponding reduction in reliability.
sampling frame	List of population elements from which we select units to be sampled.

scale	A set of symbols or numbers so constructed that the symbols or numbers can be assigned by a rule to the individuals (or their behaviors or attitudes) to whom the scale is applied.
scale interpretation error	Error associated with the use of rating cards where respondents answer with the name of a category, rather than its number or code, and the interviewer records the wrong code value because the category names are not listed on the questionnaire.
scaled-response questions	Multiple choice questions where the choices are designed to capture the intensity of the respondent's answer.
scaling	Procedures for assignment of numbers (or other symbols) to a property of objects in order to impart some of the characteristics of numbers to the properties in question.
screeners	Questions used to screen for appropriate respondents.
selection bias	A systematic effect on the data resulting from selection of respondents in a manner that deviates from random selection, so that some types of respondents are over- or underrepresented in the sample.
self-administered questionnaire	A questionnaire filled by out by the respondent with no interviewer.
significance level	The probability that the magnitude of the relationship might result in a sample of that size purely from sampling error if, in fact, it did not exist in the population.
simple random sample	A sampling design that seeks to select respondents from the population or sample frame in a completely random fashion, so every respondent has an equal probability of being selected, and no clustering or stratification methods are used.
skip pattern	Requirement to pass over certain questions in response to the respondent's answer to a previous question.
statistical analysis	The process of computation and manipulation of sample data in order to suppress the detail and make relevant facts and relationships more visible and meaningful, and to generate statistics in order to make inferences about the population as a whole.
statistical inference	The process of generalizing information from a sample to the population as a whole by estimating population parameters, based on their corresponding statistical values from the sample.
statistical significance	An explicit assumption by the analyst that a relationship revealed in the sample data also exists in the population as a whole, based on the relatively small probability that it would result only from sampling error if it did not exist in the population.
stratified sampling	A sampling design that divides the population into specific strata containing certain types of respondents, then selects subsamples of the required size for each strata, by that forcing the sample to be more representative.
structured question	Any question that lists or prescribes the response alternatives from which respondents must choose, such as multiple-choice or true/false questions and items accompanied by rating scales.
subsample	One part of an entire sample that is singled out for special attention or analysis, often defined in terms of a demographic characteristic.

survey	A research technique where information requirements are specified, a population is identified, a sample selected and systematically questioned, and the results analyzed, generalized to the population, and reported to meet the information needs.
survey objectives	The decision-making information sought through the questionnaire.
survey research	Research where an interviewer interacts with respondents to obtain facts, opinions, and attitudes.
systematic	A relationship or effect that is not random, but rather one that is consistent or in a given "direction."
systematic bias	A redundant term, since bias is defined as a systematic effect, but commonly used to emphasize the nonrandom nature of a bias or to distinguish bias from random error.
systematic sampling	Another term for nth name sampling, where the number of units in the sample frame is first divided by the desired sample size to obtain the value of n, a value between one and n is randomly selected as a starting point or first case to be selected, and then every nth name or unit is selected, yielding a random sample.
telephone interview	Interview data collection using the telephone to contact respondents, as opposed to personal interviewing where respondents are in the presence of the interviewer and have visual contact.
validity	The degree to which the survey data or results are free from both systematic bias and random error.

References

[i]"Transit Customer Service, Self-Assessment Survey Results," Transit Ridership Initiative (1994).
[ii]"Integrating Market Research Into Transit Management," Phase I Interim Report. TCRP Project B-2. Submitted July 1994.
[iii]APTA Transit Ridership Reports.
[iv]McCutcheon, Laurie, America's Changing Demographics: Consequences for the Labor Force and Economy in the Nation and the Puget Sound Region. Institute for Public Policy and Management, University of Washington (1988).
[v]Johnston, William, Workforce 2000: Work and Workers for the 21st Century. Hudson Institution (1987).
[vi]Research & Market Strategy, Municipality of Metropolitan Seattle (Metro).
[vii]Garreau, Joe, Edge Cities. New York: Anchor Books Doubleday, 1992.
[viii]"Transit Customer Service, Self-Assessment Survey Results," Transit Ridership Initiative (1994).
[ix]METRO Rider Attrition Assessment. The Metropolitan Transit Authority of Harris County, Houston, Texas. June 1993.
[x]Drucker, Peter F. The Practice of Management. New York: Harper and Row, 1954.
[xi]Masiello, Thomas, Developing Market Responsiveness Throughout Your Company," *Industrial Marketing Management* 17 (1988), pp. 85 - 93.
[xii]"The Next Paradigm?" *Business Horizons*, June 1992, pp. 62 - 65.
[xiii]Ibid.
[xiv]McMullen, Cynthia A. "Houston Metro Puts Focus on Creating Strong Customer Culture." *Passenger Transport*, May 8, 1995 p. 24.
[xv]Day, George S. Market Driven Strategy: Processes for Creating Value. New York: The Free Press, 1990.
[xvi]Deshpande, Rohit, Farley, John U., and Webster, Frederick, "Corporate Culture, Customer Orientation, and Innovation in Japanese Firms: A Quadrad Analysis," *Journal of Marketing* (January 1993), pp. 23-27.
[xvii]Jaworski, Bernard and Kohli, Ajay, "Market Orientation: Antecedents and Consequences," *Journal of Marketing* (July 1993), pp. 53-70.
[xviii]Narver, John C. and Slater, Stanley F., "The Effective of Marketing Orientation on Business Profitability," *Journal of Marketing* (October 1990), pp. 20-35.
[xix]Kohli, Ajay K. and Jaworski, Bernard J., "Market Orientation: The Construct, Research Propositions, and Managerial Implications," *Journal of Marketing* (April 1990), pp. 1 - 18.
[xx]Ibid.
[xxi]Naumann, Earl and Shannon, Patrick, "What is Customer Driven Marketing?" *Business Horizons* (November - December 1992), pp. 44-52.
[xxii]Kohli, Ajay K., Jaworski, Bernard J., and Kumar, Ajith, "MARKOR, A Measure of Market Orientation," *Journal of Marketing Research* (November 1993), pp. 467 - 477.
[xxiii]Masiello, Thomas, "Developing Market Responsiveness Throughout Your Company," *Industrial Marketing Management* 17 (1988), pp. 85 - 93.
[xxiv]Levitt, Theodore, "Marketing Myopia," *Harvard Business Review* (July-August, 1960), pp. 45-56.
[xxv]Barabba, Vincent, "Steel Axes for Stone Age Men," in Robert D. Buzzell, ed., Marketing in an Electronic Age. Boston: Harvard Business School Press, 1985, pp. 107-133.
[xxvi]Davis, Howard R. and Salasin, Susan E., "Change: Decisions and Their Implementation," in S. Feldman, ed., The Administration of Mental Health Services, rev. ed. Springfield, IL: Thomas, 1979, pp. 117 - 130.
[xxvii]Vincent Barabba and Gerald Zaltman, Hearing the Voice of the Market. Boston: Harvard Business School Press, 1991, pp. 233-236.
[xxviii]Swiss, James E., "Adapting TQM to Government," *Public Administration Review*, July / August, Vol. 52, No.4.
[xxix]Thomas C. Kinnear & Ann R. Root (eds.), 1994 Survey of Marketing Research. Chicago: American Marketing Association.
[xxx]"Marketing: The New Priority," Business *Week*, November 21, 1983, p. 96.
[xxxi]Parasuraman, A., Zeithaml, Valarie, and Berry, Leonard A., SERVQUAL: A Multiple-Item Scale for Measuring Customer Perceptions of Service Quality. Cambridge: Market Science Institute, August 1986, Report No. 86-108.
[xxxii]William S. Royce, Corporate Intelligence (Stanford: Long Range Planning Service, Stanford Research Institute, 1971).
[xxxiii]*Consumer Market Research Techniques, Usages, Pattems, and Attitudes in 1983*, (Arlington Heights: Market Facts, Inc.), p.20.
[xxxiv]R. Kenneth Wade, "The When / What Research Decision Guide," *Marketing Research*, Summer 1993, pp. 24-27.
[xxxv]H.I. Ansoff, "Strategies for Diversification," Harvard Business Review (September - October, 1957), pp. 113 - 124.
[xxxvi]Russell L. Ackoff, **Scientific Method**. New York: John Wiley, 1962, p. 71.
[xxxvii]Randall G. Chapman, "Problem-Definition in Marketing Research Studies," *Journal of Consumer Marketing*, Spring 1989, pp. 51-59.
[xxxviii]Marketing Research Association and the Council of American Survey Research Organizations, **Incidence Guidelines**.
[xxxix]"Integrating Market Research Into Transit Management," Phase I Interim Report. TCRP Project B-2. Submitted July 1994, pp. 65-66 (unpublished).
[xl]Paul W. Conner, "'Research Request Step' Can Enhance Use of Results," *Marketing News*, January 4, 1985, p. 41.

[xli]Useful Sources are *Greenbook: International Directory of Marketing Research Houses and Services*, New York: American Marketing Association, Annual; *Consultants and Consulting Organizations Directory*, Detroit: Gale Research Co., Triennial with Annual Supplements; and *Blue Book: Research Services Directory*, Rocky Hill, CT: Marketing Research Association, Annual. A list of the top 300 companies that specialize in focus group interviewing techniques can be obtained from the January issues of *Marketing News.* Listings of research companies specializing in different fields are listed in different monthly issues *of Quirk's Marketing Research Review.*

[xlii]Raymond D. Speer, "Follow These Six Steps to Get the Most Benefits From Marketing Research Consultant Project," *Marketing News*, September 18, 1981, pp. 12, 13.

[xliii]William Boulding, Ajay Kalra, Richard Staelin, and Valarie A. Zeithaml. "A Dynamic Process Model of Service Quality: From Expectations to Behavioral Intentions," *Journal of Marketing Research, 30*, February 1993, pp. 7 - 27.

[xliv]Summarized from the Malcolm Baldrige National Quality Award: 1994 Award Examination Criteria and Guidelines.

[xlv]Parasuraman, A., Zeithaml, Valarie, and Berry, Leonard A., SERVQUAL: A Multiple-Item Scale for Measuring Customer Perceptions of Service Quality. Cambridge: Market Science Institute, August 1986, Report No. 86-108.

[xlvi]Parasuraman, A., Zeithaml, Valarie, and Berry, Leonard A., Delivering Quality Service: Balancing Customer Perceptions and Expectations. New York: The Free Press, 1990.

[xlvii]Ibid., p. 23.

[xlviii]Susan J. Devlin, H.K. Dong, and Marbue Brown, "Selecting a Scale for Measuring Quality." *Marketing Research*, Vol 5, No. 3, pp 12 - 17.

[xlix]Mosteller, Frederick, "Nonsampling Errors," Encyclopedia of Social Sciences. New York: Macmillan, 1968, p. 113.

[l]Alvin Toffler, Future Shock. New York: Bantam Books 1991.

[li]Robin M. Hogarth, Judgment and Choice, 2d ed. New York: John Wiley, 1987, p. 3.

[lii]Vincent Barabba and Gerald Zaltman, Hearing the Voice of the Market. Boston: Harvard Business School Press, 1991, pp. 116 - 122.

[liii]"Integrating Market Research Into Transit Management," Phase I Interim Report. TCRP Project B-2. Submitted July 1994 (unpublished).

[liv]Gerald Zaltman, *Knowledge Use*©, The Joseph M. Katz Graduate School of Business, University of Pittsburgh, and the University Consulting Group in Marketing, 1990.

[lv]Rohit Deshpande and Gerald Zaltman, "A Comparison of Factors Affecting Researcher and manager Perceptions of Market Research Use," *Journal of Marketing Research* (February 1984), p. 37.

[lvi]"Integrating Market Research Into Transit Management," Phase I Interim Report. TCRP Project B-2. Submitted July 1994 (unpublished).

[lvii]William J. Gallagher, Report Writing for Management. Reading, MA: Addison-Wesley Publishing Company, Inc., 1969, p. 1.

[lviii]Christine Moorman, Gerald Zaltman, and Rohit Deshpande, "Relationships Between Providers and Users of Market Research: The Dynamics of Trust Within and Between Organizations," *Journal of Marketing Research* (August 1992), pp. 314-328.

[lix]Gerald Zaltman and Christine Moorman, "The Importance of Personal Trust in the Use of Research," *Journal of Advertising Research* (October / November, 1988), pp. 16 - 24.

[lx]Wilenzky, Harold, **Organizational Intelligence: Knowledge and Policy in Government and Industry**. New York: Basic Books, Inc., 1967.

[lxi]Rohit Deshpande, "The Organizational Context of Market Research Use," *Journal of Marketing* (Fall 1982), pp. 91 - 101.

[lxii]Vincent Barabba and Gerald Zaltman, Hearing the Voice of the Market. Boston: Harvard Business School Press, 1991, pp. 116 - 122.

[lxiii]Ian I. Mitroff, Business Not As Usual. San Francisco; Jossey-Bass, 1987.

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Abbreviations used without definitions in TRB publications:

AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research and Development Program
NHTSA	National Highway Traffic Safety Administration
SAE	Society of Automotive Engineers
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
U.S.DOT	United States Department of Transportation