A1E10: Committee on Paratransit
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State of the Art of Paratransit

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Paratransit means alongside transit. It includes all public and private mass transportation in the spectrum between private automobile and conventional transit. Modes that are demand responsive and provide shared rides are within the scope of the Committee on Paratransit. Taxicab and livery services are included because of the similarity of their operations to other demand-responsive service and because taxis have historically served older persons and persons with disabilities—markets traditionally served by paratransit.

In practice, paratransit covers two broad areas: (a) a specific type of paratransit required for public transit agencies to be in compliance with the Americans with Disabilities Act of 1990 (ADA), called ADA complementary paratransit, and (b) all other paratransit, which covers other demand-responsive services.

In the 1970s, when interest in paratransit first surged, it was thought to be an answer to providing transit service for all users in areas of low-density land use and low-density demand—areas not served cost-effectively by conventional transit. This thinking was based partially on the assumption that computerized control would make paratransit efficient. The technology of that day did not meet the challenge. Paratransit was commonly rationed by restricting the number of trips provided, the type of trips allowed, and who was eligible.

The ADA changed these restrictions by requiring unconstrained ADA complementary paratransit service for eligible persons with disabilities who cannot use fixed-route transit because it is not accessible, because of the nature of their disability, or because of the inaccessibility of streets or stops. Because funds are limited, in some areas older persons who do not qualify for ADA complementary paratransit service have lost a service they previously enjoyed.

RELATIONSHIP OF FIXED-ROUTE TRANSIT AND PARATRANSIT

Historically, fixed-route transit and paratransit developed independently: transit operators provided fixed-route transit, and social service agencies provided paratransit, although there were notable exceptions. Paratransit became the only public transit operation in many small cities in the states that provided funding for this type of transportation. In the 1970s, some large public transit operators—notably Rochester, New York; Haddonfield, New Jersey; and Syracuse, New York—became pioneers in the field by offering paratransit for special markets. However, the notion that paratransit and fixed-route transit both have a role in a family of services for specific markets has been slow to spread.

Passage of the ADA put all public transit operators into the paratransit business. Once they had to offer complementary paratransit service, they searched for cost-effective methods, since the federal mandate came without additional funding. It also became prudent to find ways to urge those who are able to use fixed-route service, rather than ADA

complementary paratransit services. New ideas of rider training and marketing were developed.

Changes in organizational structures, internal procedures, and the use of technology are reducing the distinction between regular route services and paratransit. Service planning will continue to move toward incorporating appropriate roles for a range of modes instead of a "one-size-fits-all" approach. Future systems will deploy a range of services in different geographic areas, by different time of day or day of week, and even within the same area but at premium fares to make public transit more attractive while increasing overall system efficiency. Paratransit and fixed-route transit will be seen as comprising a continuum of options for public transportation agencies.

SIZE OF THE PARATRANSIT MARKET AND PARATRANSIT PROVIDERS

In 1990, some 500 transit agencies carried 8.86 billion passenger trips, of which 68 million (0.77 percent) were demand-responsive trips. By 1996, demand-responsive trips had increased to about 95.4 million, 1.2 percent of the 7.96 billion passenger trips provided. The data do not include the growth attributed to increased transportation spending for Medicaid transportation, airport shuttle operations, or human service agency transportation, which are paid for through other non-FTA grant programs.

In 1986 there were 6,300 private paratransit companies in the United States. Together these firms operated more than 200,000 vehicles, representing more than 350,000 drivers and other staff, transporting more than 1.4 billion passengers. In September 1998, an estimated 22,884 private paratransit companies operated more than 370,000 vehicles.

Paratransit demand will continue to grow as a result of ADA, expansion of transit into low-density areas, sprawl that expands low-density areas, increased life activities by persons with disabilities, and aging of the population.

SERVICE DELIVERY

Basic paratransit (sometimes called "many-to-many") offers service from a user-specified origin to a user-specified destination at a user-specified time. The basic service is modified to offer service only to provider-specified destinations or in some cases one destination, such as a site for social or medical service provision (such service is called "many-to-few" or "many-to-one"). Service areas are sometimes split into zones in which vehicles are assigned. Reasons for a zonal structure include operating efficiency, customer service, and fares.

Another service variation is to separate call-taking and eligibility determination functions from the scheduling and service provision functions of paratransit. More areas are turning to brokers to manage ADA or Medicaid transportation, or both. The broker checks the eligibility of the caller and then selects and arranges the trip, merging availability with the capabilities of the rider. The service provider receives the schedule of trips from the broker at the end of the business day and assigns trips to maximize efficiency in its own operation.

Taxicab companies also are changing. In addition to adopting sophisticated dispatching capabilities, they are expanding and diversifying their businesses. Many are entering into contracts to provide employee shuttles, nonemergency medical transportation for hospitals, general community transportation, wheelchair accessible transportation, campus shuttles, student charters, parking lot shuttles, lunch transportation, and local package delivery. Companies are actively competing with private paratransit contractors for HMO and Medicaid transportation contracts and for ADA service.

It is possible to match vehicle size to demand on shorter notice and to move vehicles around a network to where they are needed. Examples include using sedans instead of vans, shifting a minibus from midday service to peak-hour feeder service, and using taxis to handle peak-period and overnight service, particularly in smaller localities. These and similar concepts are being tried in a piecemeal fashion around the United States and on a somewhat larger and more unified scale in the European Union because of much better funding of field testing.

It is anticipated that more service delivery options will be implemented as agencies search for the best fits for their areas, experiment, implement more technology, and learn more about best practices.

SCHEDULING AND DISPATCHING

Efficient use of drivers and vehicles is the key to successful transportation operation, especially for paratransit. Among the several functions required to take and process requests for service, the most difficult is the function of scheduling and dispatching. Computers were introduced in the 1970s. Their use varies from computer-aided dispatching and scheduling, in which the human dispatcher makes the decisions and the computer records the information, to fully automated, in which the computer makes the decisions and the human chooses whether to modify the trip assignments.

Fleet size affects the use of computers in dispatching. A 1996 survey of paratransit operators (TCRP Project A-6) found that most systems with 16 to 22 vehicles used computers in dispatching and that all systems with more than 36 vehicles did so. A 1997 survey of International Taxicab and Livery Association members found that fewer than 50 percent of fleets with fewer than 100 taxicabs used computer dispatching, whereas 96 percent of companies with fleets of more than 100 taxicabs used computer dispatching.

Computerization makes possible the immediate, or taxi-like, reservation service, which some agencies are offering. They argue that it leads to more cost-effective service since it virtually eliminates the problems of passengers not showing up for the vehicle and passengers canceling after trip tours are planned. Others are skeptical because of the apparent complexity of the service and the fact that, if it worked, it would be so much more convenient that it would attract many riders and break agency budgets.

LABOR

Transit agencies have adopted two strategies to reduce labor costs to offset the inherent high costs of paratransit operations. One, applicable when in-house operations are chosen, is to negotiate labor agreements with two wage scales—the usual transit wage and a lower wage for paratransit drivers. The second strategy is to contract for service with providers who typically pay lower wages. The reduction of labor wages, however, has created a problem in recruiting and retaining quality drivers in both transit agency-run systems and contracted systems. As the U.S. economy continues to be robust, employment opportunities for and salary levels of lower-skill-level workers continue to grow. This has reduced the supply of paratransit drivers.

In addition to all the other requirements placed on drivers, such as securing wheelchairs and assisting passengers, paratransit drivers operating larger vehicles must possess a commercial driver’s license. This requirement places paratransit companies in competition with trucking and delivery companies that pay higher wages. To be competitive, transit agencies will have to find ways to pay more or provide increased benefits to retain good paratransit personnel. The difficulty in hiring, training, and retaining qualified paratransit

drivers will continue to be a problem in the paratransit industry until the industry finds a way to compensate quality drivers.

Taxicab drivers tend to be independent contractors. Finding people who have the entrepreneurial skills to be independent contractors and who meet all the requirements of a paratransit driver is an even more difficult task.

MANAGEMENT OPTIONS

There is no one correct way to manage paratransit. An agency responsible for the provision of paratransit has the option of managing the system itself or contracting for one or more functions. Many agencies operate their systems with in-house resources under the premise that control begets better service quality, even though it is likely to cost more (because of union wages, etc.). This is especially true when a smaller volume of trips is involved; because the amount of work is manageable, it can be handled centrally by the sponsoring agency.

If an agency decides that it does not have or does not wish to hire experienced staff to operate or manage the system, it may contract for some or all operations. American Public Transit Association data indicate that 58 percent of transit agency expenditures for demand-responsive services in 1996 were payments to third-party contractors (for-profit and nonprofit operators).

There appears to be a trend among larger systems to outsource operations to more than one contractor. This approach is being taken not only to create more manageable pieces of work, but also to establish ongoing competition throughout the contract term (in order to maintain a high level of service quality) and to create viable fallback alternatives for carriers who perform in a substandard fashion or default.

There, the knowledge at the local level of what management alternative makes the most sense. Further, there is very little information at the national level relating to the organizational and management structure of most paratransit systems. With the myriad of possibilities available, paratransit practitioners would benefit from (*a*) a national database that has expanded information relating to organizational and management structure and (*b*) guidance on the criteria used to determine the appropriate organizational and management structure. This type of data would enable practitioners to self-select peers—for example, on the basis of common demographic and ridership data—to see how they structured the management component of their systems, as well as other factors.

For paratransit offered by larger public transit systems, the trends of contracting are mixed. Management will be under pressure from unions trying to expand their membership by incorporating paratransit employees, while budgetary pressures will argue for continued outsourcing of paratransit operations. For municipally operated paratransit services, the predominant future organizational form will probably be outsourced or contracted services. Private firms involved in operating paratransit services under such contracts will become more technically astute and market driven, offering paratransit services that are tailored to their changing communities and demographics.

COORDINATION

In many urban and suburban areas, organizations offer some type of paratransit. Typically, a transit operator will offer ADA complementary paratransit, and social service agencies will offer paratransit for their clients using federal funding from one of 90 programs (listed in *Building Mobility Partnerships*, CTAA, May 1996). The motivation for collaboration, coordination, or even consolidation among these providers is to achieve economies of scale

through increases in demand density, resulting in more shared riding and lower unit costs. Paratransit services often are operated by the sponsoring agencies (cities, counties, transit districts, and social service agencies) themselves. In a growing number of other communities, however, agencies are coordinating to provide paratransit services.

In urban areas, coordination has taken place largely within existing human service networks; in rural areas, coordination occurs across programs because transportation is normally provided by a single organization. The impediments to coordination include the fear of losing the ability to ensure good service to existing clients, the loss of the funding that may support other activities, the concern that there will not be significant cost efficiencies, and the regulations governing funding that will not allow commingling of passengers.

Paratransit practitioners would benefit from more quantitative evidence to determine (*a*) whether certain types of coordination make sense from the overall community perspective, (*b*) what benefits will likely accrue to prospective sponsors and their riders, and (*c*) whether these benefits when combined with agency-specific or communitywide political realties are sufficient to pursue implementation.

QUALITY AND COST

On a per-passenger basis, paratransit is relatively expensive, although the cost can be competitive in low-density environments. Therefore, except for exclusive taxi service and a few other specialty markets, paratransit typically requires large subsidies. Subsidies for general public and ADA complementary paratransit have come from transit agencies or local government. Subsidies for specialized markets have come from the agencies responsible for providing human services.

For public transit operators, success in making paratransit convenient and attracting riders escalates the demands for funds and establishes a competition for funds between fixed-route transit and paratransit. In response, operators have sought ways to reduce paratransit costs. Contracting is one such method. However, contracting based on a low-bid approach presents the challenge of finding ways to set and sustain minimum service quality standards. Ideally, service would be procured as a request for proposals and evaluated on the basis of the proposer's ability to perform the work at a reasonable cost, rather than simply on the basis of the lowest bid.

In the future, research on the relationship of quality and costs will be performed, and tools will be made available to operators. This will allow operators to sit with riders in workshops and jointly identify the results of different resource allocations. This should provide policy makers and users' groups with tools to identify consensus plans for operating paratransit.

MEASURING PERFORMANCE

A key to effective transit management is to compare one's system against some standards of performance. Two types of standards are useful—the agency's historical performance and the performance of peers.

The development of an internal database, which allows an agency to compare changes in its own performance, is within the control of the agency. It needs to select the useful measures of performance and implement a reliable measurement system. Measurements are taken periodically to evaluate the results of changes and innovations.

Determining the performance of a system in a more absolute sense by comparison with other systems is a difficult task. First, definitions of terms vary from system to system. For

example, revenue service hours are calculated in a variety of ways, some depend on whether deadhead is included, others depend on whether excessive midroute breaks in service are included. Passenger trips completed may or may not include attendants and companions. Definitions vary not only because of measurement or calculation differences, but also because of local policies and procedures. For example, the criteria for late trips, missed trips, and carrier and passenger no-shows vary widely, depending on local policies and procedures.

Another difficulty is the tremendous variation inherent in paratransit services. A useful comparison structure would have to take into account differences in geography, local traffic conditions, rules and procedures (e.g., curb-to-curb versus door-to-door), patterns of service, degree of assistance provided to passengers, and dwell time and waiting time policies. A classification system that defines paratransit system types is needed so that similar systems can be compared. Whereas National Transit Database reporting requirements should be based on standard measures, the definitions used are not adequate. Since no standard services exist, there are no benchmarks of performance to judge apparently similar services operating in different localities. A classification method would aid in performance evaluation and would increase the reliability of adoption of practices in different locations.

As paratransit budgets continue to consume a larger share of public transit funds, policy boards and managers will feel a greater urgency to know how much better paratransit could perform. This need will eventually lead to the comprehensive research necessary to develop standards in the paratransit industry. Such a study also should develop a national reporting system for the recording of paratransit operational and financial statistics, as well as auditing to ensure accuracy and reliability.

TECHNOLOGY

In the late 1960s and early 1970s, the premise for successful and widely applicable paratransit service was based on the use of technology, specifically the computerized dispatching and scheduling that would make 6 to 8 passengers per vehicle-hour possible. The concept floundered because, by and large, such productivities were not achieved. Experts may disagree on the reasons why, but some or all of the following may have contributed: (*a*) the relatively high cost of computer time in the 1970s, (*b*) the inadequacy of scheduling and dispatching algorithms, (*c*) poor service, (*d*) service area configurations, and (*e*) unrealistic enthusiasm of the researchers and promoters. On the other hand, without that optimism, the experimentation with demand-responsive service may not have proceeded, and the concept may not have been perceived as a supplement to fixed-route service.

Several information technologies are being used or planned for paratransit service: digital radio frequency data communication, mobile data terminals and computers, vehicle location devices, mapping software and geographic information systems, card-based data storage and transfer media, computerized order taking and scheduling and dispatching, and telephone- or Internet-based technologies. In general, technology makes possible many enhancements that could improve service and lower costs. Among the notable possibilities are automatic communication with riders during trip reservation and just before pickup, transfer coordination, and use of real-time traffic conditions in scheduling and dispatching.

There is a lack of objective information evaluating the effect of these technologies on service and costs. Questions remaining to be answered include the following: How can technology be used to assist operators? What can’t technology provide? What are the costs?

What are the savings? What are the advantages and disadvantages of various communications systems? What trip volumes and features can each type handle?

VEHICLES

The goal of universal design and other initiatives is to allow all persons to use transit more easily, including those with mobility impairments, hearing or vision impairments, cognitive impairments, or combinations of those disabilities, as well as other riders with trip-specific needs as a consequence of carrying packages or suitcases or pushing baby carriages. The vehicles used to supply paratransit include sedans, vans, ramp- and lift-equipped vans, minibuses, and low-floor buses.

Pioneered in England, the accessible taxi sedan is one of the latest trends in vehicles. People who require accessible vehicles benefit from this trend because these taxicabs are used in taxicab service when not required for contract work. Further, companies are finding that to meet the demand for service for people with disabilities, they must purchase accessible vehicles. Once in service, companies are finding that there is demand for accessible taxicabs from people in the disabled community not eligible for subsidized paratransit.

The latest small bus designs, although they have not yet reached the United States, allow the internal configuration to be changed quickly. This allows the same vehicle to be used to carry multiple wheelchairs, to carry able-bodied persons to a trunk route, in rural transit operations, and for package delivery, all over the course of one 24-hour period.

As in the use of technology in general, operators need more information on vehicle performance and client satisfaction.

SUMMARY

Paratransit is poised to make major improvements in its quality of service and to increase productivity and its overall usefulness to urban public transportation systems through better information technology and better vehicles. The speed at which these changes occur will depend on how quickly agencies can move toward integrated planning. This will require a shift to a paradigm that views paratransit as playing an essential role in transit systems by providing service to low-density markets. The paradigm shift will be encouraged by the current interest in smart growth, which is based, in part, on providing many alternatives to automobile travel.