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Knoxville Brokerage Demonstration: A Retrospective View

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Results of an extensive evaluation of the Knoxville transportation brokerage demonstration, the first metropolitan, multimodal implementation of the brokerage concept, are presented. The demonstration involved the establishment of the Knoxville Commuter Pool, an organization that sought to identify and match transportation demand and supply among a variety of users and providers. Primary emphasis was on service to two market segments: commuters and social service agencies. Although the Knoxville experiment in brokerage was very successful in achieving institutional changes conducive to the growth of shared-ride modes, its impact on travel behavior was quite limited. Nevertheless, the flexibility inherent in the brokerage concept may be a key in the search for better solutions to transportation problems. Continued research in this area, as well as the rising cost and decreasing availability of energy, may significantly increase the impact of future brokerage organizations on their communities.

A transportation broker identifies and matches the needs of individual travelers with a range of existing and/or new transit services to provide a more efficient and effective transportation system. The broker often acts as an advocate for shared-ride modes (e.g., carpooling, vanpooling, and conventional mass transit) and in this capacity may work for whatever institutional or regulatory changes are required to facilitate their wider use.

From October 1975 to December 1978, Knoxville, Tennessee, was the site of a demonstration of the nation's first metropolitan transportation brokerage service, conducted as part of the Service and Methods Demonstration (SMD) program of the Urban Mass Transportation Administration (UMTA). The SMD evaluation report (1), on which this paper is based, covered the first 32 months of the demonstration (the "evaluation period") in detail, from its inception until June 30, 1978; however, where they were available, data on the final 6 months of the project were incorporated.

The Knoxville broker--known publicly as the Knoxville Commuter Pool (KCP)--was initially operated by the Transportation Center of the University of Tennessee under contract to the city of Knoxville (the official grantee). After 20 months, operations were moved to the newly formed Knoxville Department of Public Transportation Services. Although the KCP service area nominally included the 16 counties of the East Tennessee Development District, brokerage activities focused on the considerably smaller Knoxville standard metropolitan statistical area (SMSA), which had a 1975 residential population of 435 400 (2) and an estimated work-force population of 194 600 (1).

PROJECT BACKGROUND AND SCOPE

Express bus and commuter ridesharing programs in Knoxville date back to 1973, when the first of a series of successful express bus routes serving the downtown was implemented. From the outset, employees of the Tennessee Valley Authority (TVA), the downtown's largest employer, formed the nucleus of the service's ridership. In 1975, TVA introduced its Commuter Pooling Demonstration Program, which provided its 3100 employees with monetary incentives for shared riding and assistance with carpool and vanpool formation. (The TVA credit union had also just initiated a vanpool leasing demonstration.) The TVA incentive program further spurred the growth of express bus services; within two years, 22 routes were in operation. This program also provided an example of how effective a comprehensive ridesharing program could be under the best of circumstances (i.e., strong management commitment by a single large employer, financial incentives, and a shortage of parking). From November 1973 to January 1976, the percentage of TVA downtown employees who drove alone dropped dramatically, from 65 to 19 percent (3).

Concurrently with the growth of express bus services, the Transportation Center of the University of Tennessee was engaged in a study of employer-based rideshare matching for the U.S. Department of Transportation (DOT). A major conclusion of that effort was that a brokerage system involving a broad range of transit and paratransit modes seemed the most promising approach to solving many traditional transportation problems (4). To implement and test this recommendation, the city of Knoxville, with the assistance of the University of Tennessee, applied to UMTA for demonstration funding in April 1975.

The original scope of the brokerage project was extremely broad (5), encompassing all of the following tasks:

1. Identify the travel demand of commuters, social service agencies and clients, and the jobless, as well as the potential demand for goods movement (prearranged travel only);
2. Identify the range of existing and potential transportation suppliers, including public and private operators and individuals who have cars or vans available for ridesharing;

3. Acquire a fleet of 51 "seed vans" for lease to private individuals and establish and operate maintenance, accounting, and control procedures for these vans;
4. Match potential users and suppliers and foster agreements between riders and providers for prearranged service in areas currently not served by transit;
5. Provide information on available transportation services, costs, insurance, etc.;
6. Maintain liaison with Knoxville Transit and public agencies involved with transportation services and facilities; and
7. Actively promote institutional and regulatory changes that facilitate the operation of the brokerage system and/or broker-managed services.

LABOR NEGOTIATIONS

Even before the grant application was submitted, University of Tennessee staff met with representatives of the Amalgamated Transit Union (which represented Knoxville Transit employees) and the U.S. Department of Labor to discuss labor protections required by the use of federal funds. A major issue was the potential for competition between the paratransit services to be fostered by the demonstration and existing (unionized) transit services. Negotiations proceeded slowly, and the actual Section 13c agreement (Urban Mass Transportation Assistance Act of 1964, as amended) was not signed until October 25, 1975, which delayed the planned start of the demonstration by almost four months. Together with two supporting documents, the agreement stipulated that

1. All major maintenance on seed vans garaged in or serving Knoxville (except warranty and emergency work and work performed by driver-operators) would be performed by employees of Knoxville Transit;
2. The size of the bargaining unit would be guaranteed for four years or until the seed vans were removed from service, whichever occurred first;
3. Seed vans would be targeted for areas not served by conventional transit; and
4. Any buspools formed by KCP would be operated by Knoxville Transit.

Although it was never the intention of KCP to retain its van fleet indefinitely, the question of how, or when, it would terminate its role as a lessor was never directly addressed. Thus, when the demonstration was later extended by 18 months and a decision was made to sell the fleet to existing driver-operators (under the stipulation that they continue to operate a pool), an amendment to the agreement became necessary. After 3 months of discussions, an amendment was signed in September 1977 that

1. Extended the duration of the original labor protections by 1.5 years,
2. Released vans sold by the city from the requirement that maintenance be performed by Knoxville Transit personnel, and
3. Required that the sale or transfer of any van to a third-party operator contain an agreement that the buyer not actively solicit or carry any rider whose residence and worksite are both within 0.25 mile of an active bus line operated by Knoxville Transit or others under contract to or franchise from the city.

The city also agreed to investigate any claimed violation of the agreement and, if necessary, to act to remedy the situation.

LEGISLATIVE AND REGULATORY ACTIVITY

Shortly after the demonstration officially began in October 1975, it became apparent that the intended scope was too broad to be accomplished in the 20 remaining months. A key factor was that the elimination of institutional barriers, some of which had not been recognized prior to implementation, had quickly become a major area of activity. These efforts were to prove the most successful and far-reaching of the demonstration, but they were extremely time-consuming and siphoned the limited staff away from other (planned) brokerage activities. Initial efforts were directed at eliminating the barriers to the KCP seed vanpool program and the growth of privately owned vanpools (i.e., owned and operated by the driver).

Vanpool Deregulation

In November 1975, university staff contacted the Tennessee Public Service Commission to determine how existing statutes would be applied to vanpooling. The commission ruled that vanpools were public carriers and thus subject to the certification process (6). Since this requirement would have been virtually fatal to the vanpooling program, KCP set out to free the mode from such regulation. Its effective political activity was rewarded in March 1976 with the signing of a bill that exempted commuting vehicles carrying 15 or fewer passengers from any government regulation except that deemed necessary to ensure adequate insurance coverage and safe operation (7).

Vanpool Insurance

One motivation for seeking to eliminate the regulation of vanpools was the effect regulation could have had on the cost and availability of vanpool liability insurance, a complex subject examined elsewhere by Davis and others (8). When KCP sought such insurance just before the start of the demonstration, it was turned down by about a dozen companies before coverage was finally found, and then the premium was 86 percent higher than it would have been for comparable insurance on a private automobile. Since insurance is a major component of vanpool operating cost, high premiums have an important effect on the mode's competitive position. KCP therefore set as a goal the availability of adequate and reasonably priced insurance coverage for both fleet and privately owned vanpools.

Again, KCP's efforts proved successful. In early 1977, the Insurance Services Office (ISO), an industry-supported organization that collects and analyzes data and publishes classification and rating guides, announced a new nationwide policy that treated privately owned vanpools the same as other private passenger vehicles and created new classifications for leased and employer-owned vans (8). Although the existence of these new national rating schedules did not guarantee the availability of insurance on a local basis, by the end of the demonstration five companies in the Knoxville area were offering insurance to private vanpoolers at ISO rates.

Other Institutional Activities

Although KCP's institutional activities in support of vanpooling were the earliest of the demonstration and the most important to the implementation of planned demonstration elements, they were by no means the only areas of effort or success. In 1977, KCP's leaders proposed and helped draft extensive state legislation that was supportive of general brokerage goals and objectives. Among the changes that resulted from these efforts were the following:

1. Elimination of the vestiges of state regulation of vanpooling (i.e., the safety and insurance provisions retained in the 1976 bill),
2. Authorization for the Public Service Commission to designate certain counties as "citizen transportation areas" (thus allowing church and/or privately owned vehicles to be used for passenger service) and to allow motor carriers to drop unprofitable routes (under certain circumstances),
3. Legislation that allows motor carriers to experiment with new routes for as long as six months without having to obtain specific certification, and
4. Extension of state insurance statutes regarding coverage for the "underinsured motorist", which yielded better protection for those in high-occupancy vehicles (6).

KCP also developed a new taxi ordinance for Knoxville that modernized the allowable fare structure and range of services and thus made the industry more financially viable; for example, the ordinance legalized and endorsed shared riding, opening the door to a wide range of specialized new services, such as feeders to conventional transit. Clearly, the broker's institutional successes were impressive in both number and scope.

Political Issues

The demonstration was not without political problems. In early 1977, the Knoxville Department of Public Transportation Services (which had responsibility for the brokerage service and several months later would become its home) became embroiled in a series of controversies, including a particularly heated, six-week-long transit strike and emotional disputes over transit service cutbacks aimed at controlling the city's sharply escalating transit deficit. Although KCP was not directly involved in either issue, at least a vocal minority of the public and of the membership of the local transit union perceived the broker's efforts to promote carpooling, and particularly vanpooling, as either detrimental to or competitive with the provision of traditional fixed-route transit services, which these groups sought to protect. Consequently, they fought to limit the influence and control of the proponents of brokerage. This opposition proved to be a major frustration. As a public relations problem, it took valuable staff time away from other brokerage functions; it also blocked the implementation of changes in governmental organization that might have increased the broker's flexibility.

COMMUTER RIDESHARING ACTIVITIES

Surveying and Matching

The thrust of the KCP approach to commuter travel was to promote and facilitate the use of ridesharing modes (including, but not necessarily limited to, carpooling, vanpooling, and bus transit). Although a broad range of promotional activities was involved, the primary tool in the effort was an areawide employer-based surveying and matching program designed to identify and assist interested commuters. Over the course of the demonstration, 829 employers were contacted and 391 participated in the program. Figure 1 shows the number of employees involved in this process. (Any interested commuters at nonparticipating companies could submit the necessary information by telephoning KCP.) By June 1978, a total of 23 815 employees--about 12 percent of the market population--had completed surveys, and pertinent data concerning their travel patterns had been entered into a master data file.

Computer matching techniques, including modified Federal Highway Administration (FHWA) software and later KCP-designed systems, were used to develop and print one or more "match lists" for each individual on file; these lists identified other commuters with similar travel times, origins, and destinations with whom the recipient might carpool or vanpool. For those employed in downtown Knoxville, information about existing vanpools and/or local or express buses was also provided. The average match list for a downtown employee contained the names of 10 potential poolers, and approximately 45 percent of the recipients were matched with one or more bus routes or vans.

Vanpool Program

KCP's purchase of 51 vans for lease to individuals with the sufficient number of pool members, long enough commutes, and an interest in operating their own vanpools was a unique aspect of the demonstration. The intent was to use these seed vans to demonstrate the attractiveness of vanpooling and thereby spur the growth of a large, privately owned fleet of vanpools (9). As Figure 2 shows, KCP was quite successful in leasing its van fleet and in keeping it leased, except for a few vehicles deliberately retained for backup and promotional purposes. [It should be noted that the decline in fleet size and number of vans leased in 1978 indicated in Figure 2 reflects the sale of the vans to existing driver-operators, who continued to remain affiliated with KCP through membership in the Knox Area Vanpoolers Association (KAVA), described below.] Unfortunately, there is no way to determine how many vans KCP could have leased if there had been no supply constraint.

Average daily commuting distance for seed vans over the course of the evaluation period was 61 miles. Average occupancy was 10.5 persons/van, including the driver. Since KCP's suggested fares were calculated to allow break-even operation with 8 paying passengers and the driver riding free (9 paying passengers for the few 15-passenger vehicles in the fleet), the average occupancy indicates that many drivers either made a profit or reduced rider fares (this choice was at the driver's discretion). Interest in driving a van was expressed by about 9 percent of the individuals in KCP's master file and, when KCP decided to sell off its vehicles to existing driver-operators, it had relatively little difficulty.

However, the large fleet of private vanpools that KCP sought to create apparently did not materialize, at least as of the end of the demonstration. At that time, aside from the seed vans sold by the city, only six private vanpools were specifically known to be operating. Their owners, as well as the individuals who purchased seed vans, belonged to the KCP-established KAVA, which was formed to help vanpool operators manage their businesses and to obtain discounts on automotive parts and service for its members.

Other efforts by KCP to encourage the growth of private vanpool operation included work with the Tennessee DOT that resulted in a state-funded vanpool abort program to protect operators from capital loss and to provide for 100 percent financing of vehicle purchases. Unfortunately, most of these inducements became operational rather late in the demonstration, and there was only limited opportunity for direct promotion of private ownership before the conclusion of the project. By December 1979, a year after the demonstration ended, KAVA membership had grown to 71 vans (including former seed vans) and 3 privately owned and operated buses.

The success of KCP in keeping a high percentage of its van fleet leased resulted in a profit (i.e., net revenue) of \$2333 for vanpool operations over the evaluation period (before administrative and overhead expenses of \$60 466 attributable to this aspect of the demonstration). During the final 12 months of the period, however, after warranty service for much of the fleet had expired, maintenance costs rose very sharply, and the

Figure 1. History of KCP employee contact and participation.

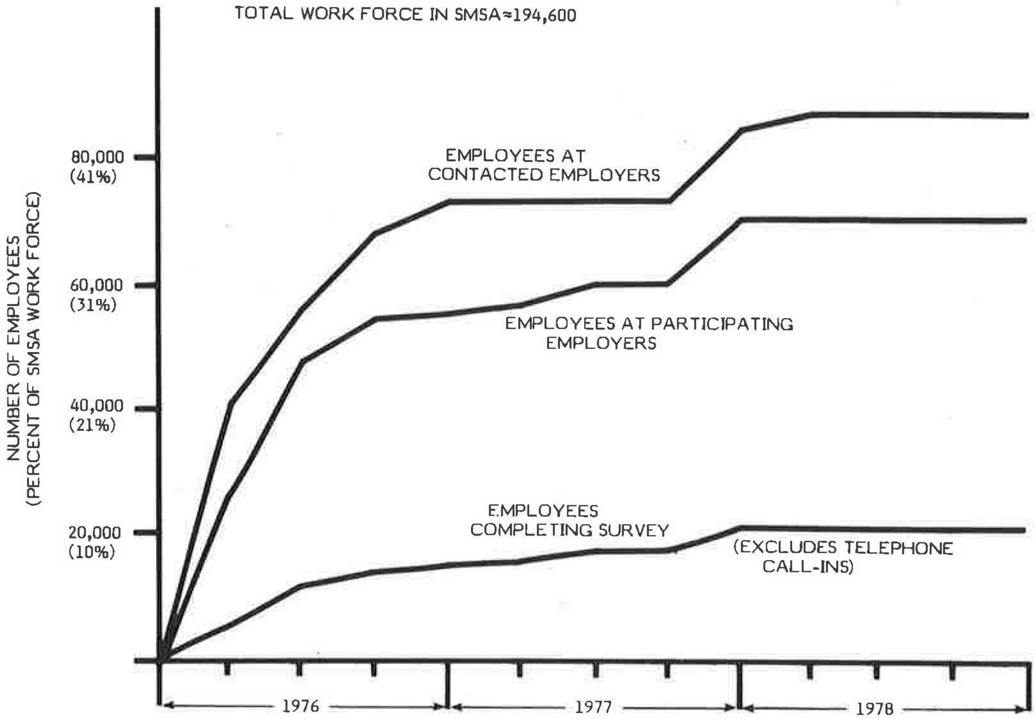
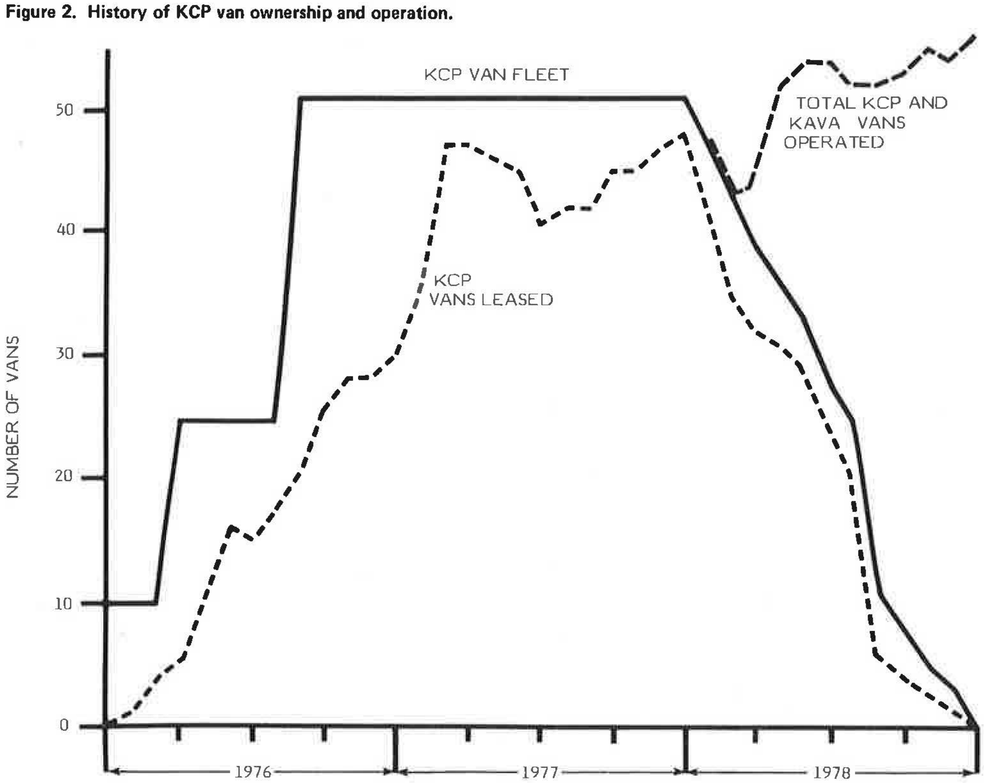


Figure 2. History of KCP van ownership and operation.



operation sustained a loss of $5474. (Allowances for maintenance were significantly lower than actual expenses during this period, partly because of expenditures made in readying the vans for sale.)

Impacts on Commuters

In spite of KCP's extensive efforts to increase commuter ridesharing, the broker's impact on areawide travel behavior was quite limited. Although an estimated 22 percent of match-list recipients contacted others and/or were contacted about forming or joining a carpool or vanpool, by June 1978 the most favorable of several surveys of list recipients indicated that 5.9 percent (±1.1 percent) had shifted modes as a result of KCP activities. Estimates are that 0.8 percent (±0.7 percent) of all SMSA commuters were influenced by KCP in some way to make new ridesharing arrangements (regardless of whether a match list was involved). These statistics, which are reported at the 90 percent confidence level, include individuals who shifted among ridesharing modes and those who began ridesharing but later stopped. Thus, the overall impact of the demonstration in terms of mode shares was quite small.

In the later stages of the demonstration, KCP implemented a personalized telephone follow-up procedure designed to increase new ridesharing arrangements among match-list recipients. KCP's own survey effort indicated that this was significantly more effective than simple distribution of match lists but, since the number of commuters contacted was limited, the total number of people who shifted modes as a result of this effort was very small.

However, the foundation of the brokerage concept is its attention to individual--rather than aggregate--needs. In addition to those reached through employee surveys, more than 2000 people telephoned the broker and were given transportation assistance or other information during the demonstration. In three instances, when underused bus routes were terminated, KCP worked with the affected riders to arrange carpools and vanpools to meet their needs. In addition, perhaps as many as 1000 individuals, including more than 100 drivers, were introduced to vanpooling for the first time. Thus, although the broker's aggregate effect on areawide commuting was modest, from the perspective of the many individuals aided by KCP its impact was substantial.

SOCIAL SERVICE AGENCY ACTIVITIES

Through a survey distributed to 179 social service agencies in the Knoxville area, KCP identified and subsequently interviewed 22 that provided transportation services to clients (to and from the agencies themselves and/or for use in specific agency activities) and were interested in discussing alternative arrangements with the broker (10). In four cases, KCP performed "transportation audits" to determine the agency's needs and possible service solutions. In two of these instances, KCP contracted with both a local van operator and the agency to implement the recommended service. Since the broker "purchased" the services at $0.45/mile traveled and "sold" them for $0.55/in-service mile, it had a $0.10/mile differential to cover deadheading and to help defray its administrative expenses; however, KCP was forced to cancel one of these arrangements because the deadheading was such a high percentage of total mileage that the broker lost money on each trip. In another instance, KCP provided information to an agency that enabled it to make its own arrangements at a considerably lower cost than had been available before the agency contacted KCP. These activities were helpful to a small number of agencies, but they did not have the wide-ranging acceptance and impact for which KCP leaders had hoped; one reason for this may have been the somewhat limited attention given to this area during the demonstration.

BROKERAGE ECONOMICS

Net project costs during the 38 months of the demonstration totaled approximately $844 000. Of this amount, about $780 000 came from the SMD program, and the remainder was received from a variety of local, state, and federal agencies.

Table 1 gives brokerage operating expenses and revenues by function over the first 32 months of the demonstration, the period for which such data are available. Although this information provides insight into the nature and magnitude of brokerage costs, it is important to recognize that innovative demonstrations involve unusual start-up, coordination, evaluation, and other expenses. Furthermore, since the table indicates the costs incurred in performing a particular combination of interrelated functions, inferences about the cost of implementing a subset of these activities may be invalid. (For example, the recorded seed vanpool costs exclude surveying and matching activities, which were separate but necessary companions to the operation of the vanpool program.) Thus, using Knoxville's cost data to project the cost of future brokerage operations is not a straightforward endeavor. For a detailed analysis of the costs of the demonstration, the interested reader is referred to Juster and others (1).

STATUS OF KCP AFTER THE DEMONSTRATION

Although the Knoxville brokerage service was funded as a demonstration project, the problems it sought to address obviously required a continuing (rather than short-lived) commitment, and there was every expectation in 1975 that the organization would carry on after the demonstration period ended. However, KCP was always intended to be a regional brokerage service, and its establishment by and within the city government raised inevitable problems, perhaps the most pressing of which became how to pay for the service after federal demonstration funds were exhausted. (Knoxville could hardly be expected to pay the entire bill for service provided to residents of a 16-county area.) As the demonstration drew to a close, KCP actively sought to solve this problem by moving from the city to a more regionally oriented base.

In January 1979, KCP was reestablished within the Transportation Center of the University of Tennessee. Funding was provided by the Tennessee Energy Authority, the Tennessee DOT, and the city of Knoxville. KCP's new role, however, was substantially reduced from that of the original demonstration broker; the primary focus was now on continued rideshare matching and promotion and the design and implementation of statewide programs that support ridesharing.

CONCLUSIONS AND RECOMMENDATIONS

The Knoxville demonstration represented a first, bold, barrier-breaking attempt at areawide implementation of the brokerage approach to solving transportation problems. As with any complex and innovative undertaking, its efforts met with varying degrees of success. However, its greatest value may well lie in the wealth of information it can provide

Table 1. KCP operating expenses and revenues by function: October 1975-June 1978.

Function	Expenses ($)	Revenues ($)	Net Costs ($)
General administration	167 641	–	167 641
Institutional activities	62 914	–	62 914
Surveying and telephone inquiry	59 307	–	59 307
Match-list processing	71 803	–	71 803
Software development	72 219	–	72 219
Seed vanpool operations	340 192[a]	282 059	58 133[a]
Social service agency transportation	25 115	7 425	17 690
Public relations and promotion	110 475	–	110 475
Evaluation[b]	117 902	–	117 902
Total	1 027 568	289 484	738 084

[a]Reflects all administrative expenses attributable to the vanpool operation (these expenses were specifically segregated from general administration by KCP).
[b]Evaluation and research activities by University of Tennessee staff and students.

for prospective brokers. Over its 38 months of operation, KCP was a test bed for a variety of approaches to specific brokerage functions, and the experience gained should help to indicate which of these approaches hold promise and which do not.

Since social service activities were a frequent victim of the project's persistent staff shortage, the limited achievements of the demonstration in this area seem an inappropriate measure of the value of KCP's approach to meeting agency needs. Nevertheless, although the project demonstrated the feasibility of having a broker simultaneously contract with both the supplier and the agency, KCP's role as coordinator and monitor was very time-consuming, and it was unable to achieve the intended goal of "optimal" matching of supply and demand on so small a scale. Furthermore, the single agency for which it was still providing service at the end of the demonstration soon chose to contract directly with the supplier to avoid the brokerage "commission". It remains to be seen whether, given sufficient attention and the time to develop, the approach could be made cost-effective.

Even though commuter ridesharing was the centerpiece of the demonstration in terms of the commitment of both staff and funds, the impact of KCP in this area was clearly quite limited. An obvious question is the extent to which the ridesharing market had already been tapped before the broker began operating. Available data do not indicate that this was a major factor in the results of the demonstration. Certainly some of the opportunity for pool formation had been seized by preexisting programs such as TVA's, but these affected a relatively small percentage of area commuters; the vast majority of employees in the KCP service area had not been influenced by an organized ridesharing program before the implemention of the demonstration.

Since KCP's basic approach to encouraging commuter ridesharing differed little from that of the majority of the carpool demonstration projects of the mid-1970s, it is not surprising that the results of its efforts were similar (11). In light of these experiences, it seems reasonable to conclude that, at least under the economic conditions and incentives that existed during the demonstration, the tactic of match-list distribution without active follow-up was destined to have limited effect. The hypothesis that a lack of knowledge about possible fellow poolers is the main barrier to increased pooling simply is not supported by the data. Most of those who wished to pool apparently found a way to do so on their own, and those who did not already want to pool were not convinced to take action by simply receiving a match list or literature extolling the benefits of shared riding. It is interesting, however, that the evaluation surveys indicated that 15 percent of the match-list recipients changed modes between the time they received their match list and the time they were surveyed (although the shift was presumably unrelated to KCP activities), and there were virtually the same number of changes to ridesharing modes as from them. This suggests, as F. A. Wagner has noted, that giving more attention to arresting the dissolution of pools rather than simply promoting the process of pool formation may be effective in increasing the mode share of ridesharing.

Although more evidence is needed before strong conclusions can be drawn, the personal approach embodied in KCP's telephone follow-up marketing campaign may be considerably more promising for achieving modal diversion than match-list distribution alone. It is interesting that KCP's initial marketing of the vanpool concept also relied on personal contact; staff members telephoned each potential vanpooler to try to "sell" the program and to help "break the ice". This task later became the responsibility of prospective driver-operators, but the personal marketing approach was retained and was felt to be very effective.

KCP's unique seed vanpool program clearly demonstrated the feasibility of such an undertaking, and a great deal of detailed knowledge was gained about how such a program should be organized, operated, and managed. By the end of the demonstration, however, there was no real evidence that the effort had achieved its ultimate objective--the widespread individual ownership and operation of vanpools. In addition to the possible reasons for this that have already been mentioned, it is conceivable that, by making its own van fares as low as possible to attract ridership, KCP undermined some of the incentive for private ownership. A private owner who tried to match KCP fares would have been less successful financially (if successful at all) than a lessee. Given this fact, and the risks associated with buying rather than leasing, individuals may have chosen to lease a seed van instead of purchasing their own, even if it meant waiting for a van to become available. In this way, KCP's program may actually have kept demand for seed vans high at the expense of private fleet growth.

It is important to recognize that the seed vanpool program might have proved infeasible without the institutional changes achieved by KCP and that the most important long-range impacts of the brokerage demonstration are likely to stem from its extensive institutional accomplishments. Unfortunately, since many of the gains made were local in nature, similar barriers may face future brokers in other areas. Thus, institutional reform is almost certain to remain a major and highly critical brokerage function for some time to come.

The local political problems encountered in the Knoxville demonstration may also prove not to be unique. Although on the surface they seem to have reflected the specific local environment (rather than a reaction to the brokerage concept per se), merging a multimodal brokerage approach with the existing conventional transit-oriented infrastructure apparently was threatening to certain groups. This is a problem that may face (and hinder) future brokers elsewhere.

KCP was extraordinarily successful in its pursuit of legislative and regulatory reform, but these accomplishments were achieved at least partly at the expense of other brokerage functions, which were consequently understaffed. In fact, staff shortages were pervasive throughout the demonstration, largely as a result of the ambitious goals KCP had set for itself; in response, staff members and project emphasis shifted from one activity to the next as priorities changed.

In the first few months of operation, for example, so much staff effort was directed at implementing the vanpool program that the entire project was identified by many people as a vanpooling demonstration and the credibility of KCP as an equal supporter of all ridesharing modes was damaged. The organization eventually became an even-handed advocate for all ridesharing options, but initial impressions are slow to fade.

KCP's extremely broad scope may or may not have been appropriate for an experimental demonstration, but it seems clear that future brokers would be wise to carefully match their goals, staffing, and funding based on a critical appraisal of what can realistically be accomplished in a given period of time.

Regardless of its origins, KCP's persistent shortage of staff serves to underscore the need for further research not only on which techniques are most effective but also on how basic brokerage functions might be more efficiently accomplished. There appears to be a pressing need for research in the area of employer-based surveying and master-file updating, activities on which KCP spent a substantial percentage of its resources. For example, focusing on an area's largest employers and on those most likely both to cooperate and to employ the best ridesharing prospects (based on criteria yet to be identified) would reduce the effort required in these activities and considerably increase their value (albeit at some loss of coverage). Master-file updating proved to be extremely demanding in terms of staff time and, as the demonstration proceeded, it fell progressively behind the planned 12- to 15-month schedule. In fact, by the end of the demonstration, KCP data on some commuters were almost three years old. Without a relatively inexpensive means of obtaining reasonably up-to-date data, the value of the entire rideshare matching process is questionable.

In evaluating the brokerage concept, one must recognize that, in the absence of a broker, people can and do manage to rideshare and institutional reforms do eventually occur. A basic question is which applications of the brokerage concept, if any, provide sufficient additional public benefits to justify their costs. The Knoxville demonstration apparently did little to alter the preexisting modal balance, but it was clearly a pioneering effort that involved experimentation with only a fraction of the possible brokerage functions, techniques, and organizational interrelationships over a limited period of time. Research in these areas is continuing, and the environment in which future brokers will operate--in terms of energy costs and availability, for example--is likely to be significantly different from that faced by KCP. The result could be that future brokers will have considerably more impact on travel behavior in their communities than did this initial experiment. In any event, the brokerage concept, through the creation of a mechanism for testing and coordinating new types of services, appears to offer the flexibility to search for better solutions to our transportation problems.

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