Ridesharing
Needs and Requirements:
The Role of the Private and Public Sectors

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Ridesharing
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The Role of the Private and Public Sectors

SPECIAL REPORT 193
Proceedings of the National Strategies Workshop on Ridesharing Needs and Requirements: The Role of the Private and Public Sectors

Conducted by the Transportation Research Board
Sponsored by the Urban Mass Transportation Administration and Federal Highway Administration, U.S. Department of Transportation

Transportation Research Board
Commission on Sociotechnical Systems
National Research Council

NATIONAL ACADEMY OF SCIENCES
Washington, D.C.
1981
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The first conference on ridesharing research took place in Washington, D.C., May 16-18, 1981. The conference was sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration, U.S. Department of Transportation. Conducted by the Transportation Research Board, it attracted more than 90 participants representing local, state, and federal agencies; public transportation and ridesharing agencies; private transportation providers; private employer ridesharing programs; consultants; and universities.

The National Strategies Workshop on Ridesharing Needs and Requirements focused on the roles of the private and public sectors. It was designed to identify critical questions and research needs that would constitute a ridesharing research agenda for the next several years. The purpose of this agenda is threefold:

1. To focus current research activities so that they more closely address the needs of ridesharing practitioners and policymakers;
2. To focus ridesharing research funding on the areas of greatest need; and
3. To stimulate new funded and unfunded research.

STRUCTURE

The conference framework consisted of seven topical workshops. The discussion areas were identified by the conference steering committee chaired by Christine M. Johnson. These areas were (a) roles and responsibilities, (b) productivity, (c) long-range impacts and issues, (d) travel behavior and marketing implications, (e) organizational issues, (f) operations, and (g) evaluation.

Participants in the workshop discussions were asked to generate a set of research questions and/or a list of needs related to a given subject area that would serve three purposes:

1. Contribute to the data base available in both public and private sectors,
2. Enhance ridesharing as a viable and practical transportation alternative, and
3. Aid in defining roles, requirements, and needs related to ridesharing.

The dynamics of these group discussions contributed to an important shift in the perspectives of those attending the conference—that is, the exchange of information and resulting dialogue enabled participants to understand ridesharing issues in the much broader context of changes occurring in the delivery of urban transportation services and in the concept of mobility.

The importance of this shift in perspectives is stressed in the report of the cross-sectional workshop, chaired by Daniel Roos. This workshop helped to synthesize the principal elements of discussion that occurred in the seven topical sessions. (See Part 1.)

RESOURCE PAPERS

For each of the seven workshops, a resource paper was commissioned. These papers (a) collectively documented—for the first time—the history of the development of ridesharing, policy, and operations issues that have been and are being addressed in the field; and (b) served as a springboard for consideration of future research needs. The research papers, which the conference attendees maintained would be important sources of background information for policymakers and others, are viewed as significant contributions to the ridesharing literature.

PROCEEDINGS

This report contains the proceedings of the conference. Part 1 takes note of the conference's aims and directions and includes the keynote address, a summary of conference themes, and closing remarks. Part 2 presents the workshop discussions and recommendations. The recommendations are noted here with the approval of the conference steering committee. Part 3 contains the resource papers prepared for the conference. They have been edited for inclusion in this report. Part 4 lists the participants and their affiliations.
Part 1

Introduction
Conference Aims and Directions

Christine M. Johnson

The short 10-year history of "public" ridesharing has been characterized by proliferating experimentation in services, marketing, institutionalization, and deregulation. Those involved have been enthusiastic advocates, anxious to "stop talking and start doing." Their programs have often been put together overnight and operated on a shoestring to show what could be done. In this advocacy and "seat-of-the-pants" experimentation there has been (perhaps justifiably) little patience or money for research or carefully designed experimentation and evaluation. What little money was available tended to go directly into programming "to get people into pools" rather than into research to study how to do it. Then, as programs took shape, managers were often too busy to document successes, failures, and results, thereby leaving the ridesharing literature long on advocacy and proposal articles but short on quantitative evaluations. The best "literature" of the profession has often been oral.

For one familiar with the mushrooming history of ridesharing, it is easy to draw the analogy of a youngster who daringly jumps in the pool and through much thrashing and splashing learns enough rudimentary skills to swim and survive. Eventually, however, the youngster may want to organize and perfect those skills to become truly proficient--even competitive. This conference was designed to organize and document the skills and lessons that have been collectively learned over the past decade in ridesharing. More important, however, it was designed to identify those questions (policy or operations) that most critically need to be answered over the next five years, so that our experimental efforts, evaluation, and independent research might be more sharply focused on areas where we need to grow and on problems we need to overcome.

As we enter the 1980s, there is little question that organized ridesharing, in some form, will survive. It has, in many instances, become sufficiently institutionalized to permit its practitioners to look beyond the survival needs of tomorrow and begin considering questions of, How does carpooling fit into the bigger picture? How effective is our ridesharing program? and Is ridesharing a legitimate option in the solution of the problem? These questions suggest a readiness for the kind of information that thoughtful, reflective analysis can give. At the same time greater attention is being given to ridesharing research by both researchers and funders of transportation research. Thus it is timely to draw up a short-range Ridesharing Research Agenda--a set of research questions that ridesharing practitioners, policymakers, and analysts believe need to be answered in the near future.
keynote address: the ridesharing challenge

alan altshuler

what i am going to try to do is to lay out a set of concepts, propositions about reality, and questions about ridesharing as a generic strategy. my aim is to provide a coherent framework within which to debate ridesharing issues and to clarify what i believe are the central challenges that promoters of ridesharing face.

let's begin with a couple of very basic concepts. first, it is important to emphasize that there are many types of ridesharing. nearly all the ridesharing that is out there is spontaneous. but in asking what we can do with policy, the questions are, to what extent can ridesharing be promoted by positive promotions and incentives and to what extent must we turn to negative incentives if we want to achieve substantial increases in ridesharing?

the second concept is rooted in ecology; in any national ecology the fact that a life form occupies a significant place does not mean that you can expand that place. in 1970, nearly three times as many or two-and-a-half times as many americans commuted as passengers, not just as carpoolers, by mass transit. we know that by 1980 the mass transit figure was down somewhere between 5 and 6 percent of all commuters and there is no particular reason to believe that there has been a significant decline or change at all in the ridesharing figures.

i decided to start this analysis by asking in a very general way what works and what does not. it seems clear that what we have learned since 1970 is that public education of youth and patriotism do not have any significant impact on ridesharing behavior. regionwide matching programs even with lots of advertising do not have any significant impact.

there is some question, i suppose, as to whether multiemployer, work site, third-party provider programs can work. the method that we know has a high diversion success rate, of course, is very vigorous employer campaigns in which an employer in a variety of ways communicates a policy to make ridesharing work. however, it is very important to note that even in relatively successful cases involving the creation of 50 or so vanpools in four metropolitan areas in demonstration projects, most of the diversion has turned out to be from transit and carpool rather than diversion of single-occupant commuting to vanpools.

in four demonstration cases only three provide adequate data to say what the diversion rate was. for example, in the first demonstration in the golden gate/san francisco area 65 percent were first-year van and carpoolers; in minneapolis, 73 percent; and in kennville, 64 percent.

theoretically, a variety of modeling studies have suggested that you cannot do much about ridesharing just by putting, say, a 50-cent tax on gasoline. but if you put a several-dollars-a-day tax on parking, you probably could have a quite significant impact because after all, the average person uses only about a gallon a day to commute to work round trip. so, even a 40- or 50-cent tax on gasoline would only add about 50 cents/day to the commuting cost, which is not enough to make a big difference. but if you levy a $3 parking fee, which is equivalent to a $3 increase in the gasoline tax, that would have a very considerable impact on your for this portion of the energy market.

one of the central problems of any carpool or vanpool program is lack of data. may i just mention a few key facts here? first of all, there is the fact that the survey data are not very good in terms of the extent of current carpooling behavior. typically, people are asked in surveys either whether they are carpoolers or whether they carpooled yesterday. but people are very rarely, if ever, asked whether they carpooled every day. certainly, if we are to count the rate of energy savings, we need to know whether people carpool one day a week, three days a week, or five days a week.

a very high proportion of carpooling is with other family members at the present time. i discovered a very strange thing when i was writing my book on the urban transportation system and reviewing the 1970 computer tapes from the nationwide personal transportation survey. the survey had asked drivers in carpools how many people were in their carpool and then asked other people how they traveled, a certain number of whom said that they commuted as passengers.

well, the number of commuting passengers was only two-thirds the number required to fill out the carpool as reported by the drivers. we assume that the drivers were telling the truth and that only one-third of the people they counted as being in their carpool were people who were not commuting. we calculate that probably a lot of them were children being dropped off at school and other family members making non-work-related trips. if you drop these trip makers, the carpool's average occupancy falls down in 1970 from about 2.6 to somewhere between 2.0 and 2.1 and, moreover, a lot of carpools presumably disappeared and were not part of this survey because the passengers were not commuters.

it has been suggested that somewhere in the range of 40 percent of carpools are family members. my guess is that that excludes children being dropped off at school and so on.

when one thinks of family members who are not commuting and 40 percent of the remaining passengers, perhaps, as being family members, it suggests that spontaneous carpooling among people who are not tied by family is a much less broad phenomenon than we intend to think.
Second, within car pools there is a tremendous amount of turnover. Although I have not seen the latest report on the Minneapolis project, the 1979 report, which examines the first years of the project, noted the following. First is the instability factor. After nine months it was found that the number of carpools and vanpools had increased, but the total number of people pooling or riding transit had not changed. In other words, there had been some movement around—presumably, considerable movement out of transit, out of one kind of carpool into a vanpool, and so on. But, when you look at the total figures of how people are getting to work, proportions at both of the work sites on which there were data showed no change whatever in the proportion of people driving alone. Moreover, in a fuel emergency, the amount of fuel it will be that of conserving fuel for other purposes. In a fuel emergency, the amount of fuel they can get. The only question is, will they use it for commutation or will they use it for other purposes?

As far as employers are concerned, obviously, they will have the additional incentives of being concerned to make sure that their employees can get to work—that they do not spend 3 h on the gasoline line on their way to work in the morning.

Ridesharing has both a positive and a negative side. Let us turn to some of these negative factors. Most reports focus on time losses. When Jim Womack and I were doing some analyses of this a couple of years ago, we concluded that rigidity was a more serious factor than time loss; that the great advantage of mass transit, even though it tends to be slower than ridesharing, is its frequent departures and arrivals.

The time required to make schedules is not trivial in carpools or vanpools. With a 100 percent turnover rate, one has to be dealing with that fairly frequently as well as with people who are only willing to pool with those whom they may know or those with whom they have some fairly close personal friendship. This can be an extremely serious problem and it may go far toward explaining why there is so relatively little carpooling among people who are not family members.

Finally, of course, there is great variation as to whether people consider carpooling beneficial in social terms or burdensome. But even those who might find casual conversation beneficial tend to be very concerned in many cases about such issues as allocating costs and reconciling attitudes toward how safely one drives, how punctual one is, and so on.

For employers we know relatively little about how much schedule ambiguity can entail costs for those employers who have not gotten into carpooling. We know, but we do not know a great deal, about the extent to which there is concern about leaving on employees for ridesharing purposes or the extent to which there is fear of generating backlash or using up some of the chips that management feels it has available.

We know that there is very considerable reluctance to allocate management time and energy to something that has no potential of being a profit setter and, indeed, is likely to even be a loss setter, since there are always some overhead subsidies and costs in ridesharing programs. That gets us to the issue of why governments should care what employers feel about this. In normal times the argument is, of course, that energy conservation is key, but I want to say a few words in a moment about that and what might be. It may be that in some selected situations there is an opportunity for a reduction of infrastructure requirements that would otherwise be required of commuters.

There is obviously a potential in some situations available is going to be set by indigenous forces. It will be set by rationing; it will be set by constraints of gasoline lines or closures of gasoline stations, and so on. People will use all the gasoline they can get. The only question is, will they use it for commutation or will they use it for other purposes?

So, there will be some incentives for employees that do not relate to energy conservation but relate to some other bounds. And powerful that will be appeals to patriotism that will have more impact during a really serious emergency.

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There are only a limited number of people in the labor force who can accommodate having to go to work and come back at a preselected time every time, and there are very many people who could do it but severely resist doing it. There are incentives in a great many workplaces that make it somehow hard citizenship to be quite such a clockwatcher.

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There is obviously a potential in some situations
for cutting costs to meet the base ratio in transit, thereby saving considerable resources for transit agencies, except that, in general, transit agencies do not like ridership to compete with transit. So, even many of the most vigorous ridesharing programs have had to stay out of the corridors where this function might be performed. Whether it is going to be expedient to let ridesharing perform its function, I suppose, depends on how severe the transit crisis is going to be. During a fuel emergency the key issue from the government’s standpoint is not going to be energy conservation. Again, a fuel emergency will determine how much fuel is used. Rather, the real key will be when we think that it is important to help employees, for example, save some fuel during the week so they can take vacation trips; otherwise, the tourist industry is going to be devastated by the fuel emergency.

As far as the personal disruption issue is concerned, that is a matter of government, perhaps, making it easier for people to get through the fuel emergency with less displeasure than they would otherwise experience. However, this is an intangible benefit on which it is hard to place a quantitative value.

There is the argument that government is not prepared. We know that the government is not likely to use very powerful sticks and it could be argued that without the sticks you cannot have more than a very negligible effect. So the question is why should government get engaged in an activity in which it is not prepared to implement with enough vigor to really make a difference. If one thinks about the use of sticks, let us suppose that a national will be developed to use various kinds of taxes or other sanctions to bring about fuel conservation in the United States. There is a very serious question as to whether government should lean very hard on the citizenry to save fuel by carpooling or vanpooling to work as opposed to foregoing a certain amount of discretionary travel.

We know that the citizenry will give the highest priority to getting to work and they have to consider giving up other kinds of travel. When I was Secretary of Transportation in Massachusetts in 1973-1974, I learned that it was possible to get figures from the Massachusetts Turnpike Authority on the extent to which traveling was down at various state toll points. I discovered at the peak of the energy crisis that toll revenues were down by 30 percent in the most lightly settled, rural portions of the state, western Massachusetts, the Berkshires, and so on, but down only 3 percent in central Boston commutes. Clearly, people were making local trips and doing most of their saving by taking other kinds of discretionary trips.

Is there anything wrong with that? Is there any reason why government should try to influence people’s behavior in that respect? An argument that is quite powerful in public today is that government should leave people alone except when there is a very powerful social argument for intervention. This posture certainly applies in this case. The costs of ridesharing, when you take into account the rigidity, the time losses, the patrons, as well as the dollar costs, and you offset these against the savings, the savings are quite high. The question as to whether this is the least expensive or one of the least-expensive means of energy conservation when you take into account the personal losses cannot be considered an open-and-shut case.

We do not know what the costs in terms of work scheduling and so on would be for the employers who have chosen not to engage in ridesharing promotion and, until we know a lot more about that, it can be argued that we should not be too vigorous in going beyond just persuasion.

In specific corridors, ridesharing is highly competitive even when steps have been taken to avoid transit competition.

Energy conservation benefits are, perhaps, considerably less certain. During a fuel emergency, nobody can make any serious arguments against a general encouragement of ridesharing, but many would argue against intangible incentives, such as a tax on commuter parking, given that you are not going to save any fuel in a fuel emergency and, second, that employers and consumers should be left free to cope as they will.

In reviewing the entire ridesharing picture, it seems to me that we really do not know a tremendous amount about why the successful employer programs work. We know that some employers have made it work. We are not sure which of the incentives they have used have made it work and, indeed, I suspect that the most important of these incentives is the creation of a cultural atmosphere in which ridesharing plays an important role. It may involve work reorganization in some situations so as to make it more feasible for people to predict their schedules or to get by without their cars during the working day if they have to use cars that sometimes require that they use their cars during working hours.

Two questions arise about employer promotions. First, are there any significant numbers who would respond to what I would call weak incentives? These incentives are weak because they do not involve penalties of any magnitude if you do not go along with them and they do not significantly alleviate the cost and inconvenience that an employee will experience if they respond.

The second question relates to elasticity of demand or elasticity of response to various kinds of incentives. However, we know almost nothing about how powerful the incentives would have to be to bring about really substantial increases in ridesharing. And it seems to me that we cannot say a great deal about the benefits of government intervention until we have some idea of the answers to these questions; that is, how many employers would respond and under what kinds of conditions.

To say that may seem strange but the major unknowns is how great are the energy savings. It seems to me, in fact, that they could turn out to be very trivial under certain kinds of assumptions. We do not know a great deal about the uses of cars left at home by people who enter carpools and vanpools, but there are some fragmentary studies that suggest at least 40 or 50 percent of the mileage saved tends to get used by other family members when the car is available at home.

There are an increasing number of economic modeling studies that suggest, going back and looking at the last 30 years, that households have gone to enormous lengths to hold their total transportation, personal mobility expenditures constant. They have responded to the fuel price increases of the 1970s, the changes in the cost of vehicles, and so on in ways designed to hold the total share of their personal budgets for personal mobility relatively constant.

But if that is the case, it may well be that savings in one area will tend to be reflected, at least to a limited degree, in expenditures in another area. To the extent that people save money carpooling, they may be more inclined to spend a little more driving for recreational purposes on weekends, evenings, and so on. We know virtually nothing about this at the present time.
As automobile fuel economy improves, the benefits of ridesharing are reduced as well. The obstacles to massive increases in the ridesharing modal split mean for the most part that we are talking about rather small numbers. As I have noted here, some calculations that Jim Womack and I made a couple of years ago suggested that, as of 1980, if you could get 10 percent of all the drivers—forget about the passengers, the transit riders, and so on who might be part of the potential clientele for ridesharing programs—whether they were in carpools or driving alone to shift the passenger status somehow, the saving would have been about 1.6 percent of total automobile fuel consumption (about 50,000 bbl/day). And a 10 percent diversion of all drivers is a phenomenal diversion. If one assumes that, at most, one-third of those attracted to a vanpool program would be former drivers and that over a total ridesharing program maybe half would be former drivers, we are talking about attracting a new 20 percent of the work population into a ridesharing program. In order to achieve the kind of savings that this would involve, something far beyond anything that anybody had really dreamed about today would have to occur.

I have already talked about the very high diversions. The estimates that we make in the 1980s may be unrealistic. For one thing we did not assume very high diversions in transit and carpool. We assumed in making that projection of a 1.6 percent saving that there would be no diversion from transit and that there would be only modest diversions from other pooling modes. Clearly, we underestimated the potential saving even given automobile fuel economies as of 1980.

Also, some pools we know involve central pick-up points and, to the extent that people have to drive to a central pick-up point, engage in cold-start driving, which involves a few miles but very poor fuel economy. We would have to subtract that use as well. So, again, there are savings, but whether those savings are a third or a tenth of the fuel that people would otherwise consume is an unknown fact at the present time.

It seems to me that one cannot extrapolate simply from those who currently rideshare. Those that do not currently rideshare presumably have work situations and preferences that get gradually less favorably to ridesharing. So the more people pull in, the more sense of grievance and the more sense of inconvenience and possibly even economic loss they are going to experience.

The same thing may be true of employers. Now, it may be that there are lots of employers who are simply traditional and, if you can get them to change, would discover it would be to their benefit. But it is hard to be sure of that without a lot more research than has been done to date.

Finally, how great is the potential in a fuel emergency? The unknowns here are, first, how great would a fuel shortage have to be so that large numbers of employers might begin to respond to jawboning appeals and move into ridesharing programs. Frankly, we have not seen a tremendous amount in this scale of crisis that has been witnessed to date. So, maybe 8 or 10 percent fuel shortfalls will not do it; maybe not even with 20 or 30 percent fuel shortfalls. Nevertheless, the situation may be just that kind of crisis to bring about a dramatic change in employer attitudes.

Could ridesharing under any circumstances significantly relieve gasoline lines or the need for rationing? Nobody, I think, can say at the present time.

And then, how would households use the fuel saved? Again, they would use it. One does not doubt that they would use the fuel that was saved. The question is, Would there be very positive effects on the economy if people did not have to use it all getting to work?

Then there is the question of whether, if the crisis potential is great, there is much point in our doing much before a crisis to prepare for it. Given that a revolution in Saudi Arabia, for example, would take a couple of months to visit its effects significantly in the United States, the Middle Eastern war of 1973 began in early October and the gasoline lines did not get under way until January 1974. The question of how much planning in advance or readiness preparation is needed is, again, a very uncertain question.

In conclusion, I am left with a few questions, maybe challenges, that I can pass on to this conference. First, is there much of a case to be made at present for more than a very low-key, low-cost government program of encouraging employers and employees to think about the benefits of ridesharing and providing some technical assistance to those who show an interest and who might be prevented from going forward by simple lack of capacity?

Second, is it not the time when we ought to take the opportunity to reflect a bit, to learn, and to give considerable priority to research on some of the major unknowns about ridesharing?

Finally, is there much value in contingency planning, given that ridesharing would obviously be a part of any fuel emergency strategy? In particular, would there be much value in having what I have called "fire drills," or periodic efforts, for a week every year or two for employers to actually implement their readiness plans—maybe to work with volunteer employers who could be induced on a patriotism-public relations basis to participate in ridesharing in the hope that, as they implemented these plans, some would find that ridesharing really was not so bad and would choose to engage in such programs during the rest of year as well.

These are the kinds of questions that people who are concerned with ridesharing might well address during this conference and in the months and years ahead.

[Editor’s Note: Altshuler’s address was condensed for publication in this report. His presentation also included viewgraphs and comments about them. Further information may be obtained directly from Altshuler.]
Ridesharing—Where Does It Go from Here?

Daniel Roos

It is somewhat ironic that this first national strategies workshop on ridesharing research needs is taking place here in light of two other events that occurred in this same building within about an eight-year period. Just about eight years ago, the Transportation Research Board's Committee on Parallel Transit held the first ridesharing workshop. It was the first time that people actively involved in ridesharing had an opportunity to realize that there were quite a few other persons also interested in this sort of activity. Although a very diverse group attended this first meeting, the only predominant thread among them was that, with very few exceptions, no one had a formal background in transportation. They were people involved in ridesharing for a variety of reasons, many of them only secondarily concerned with transportation.

The second event took place here just last week—an international conference on ground transportation sponsored by the U.S. Department of Transportation, the Organization for Economic Cooperation and Development, and the Transportation Research Board. At this time, the deputy director of the Office of Management and Budget (OMB) addressed the gathering on the Reagan administration's transportation philosophy. What struck me about that talk was the fact that the OMB representative made a major point of emphasizing paratransit and ridesharing. I observed at the time how far this subject has come in a relatively brief period.

This is by way of introduction to my assignment during this conference on research needs and the roles of the private and public sectors and to the challenge of distilling all the workshop discussions and crystallizing them for you.

Picking up the major thrust of a conference midway through its proceedings is a big challenge. Nonetheless, because one of the purposes of this conference is to identify research priorities, I sought to do this by raising a series of questions, things that are currently unknown. It strikes me that from the questions raised will come a series of issues to be researched.

There were five questions that most of the discussion tended to focus on in a general sense: What do we know? What does it mean? How do we sustain, defend, and promote ridesharing? Where do we go from here? and How do we get there? Now, in terms of the sorts of things that were talked about, let me divide these into two areas. I think there was a set of issues that had to do with continuation, evolution, and expansion of ridesharing in an incremental, evolutionary sort of way. How do we continue doing more of the same, but do it better?

Then, let me talk about what might be called a series of broader issues and broader questions. The issues that I am addressing (here) tended to be issues that were raised by many of the groups.

MOTIVATION TO RIDESHARING

First of all, a series of questions exists on what motivates commuters and companies to rideshare. What are the economic, social, and psychological factors that are most important? How can we use these to affect marketing programs and marketing from the viewpoint of the individual, from the viewpoint of the employer, and from the viewpoint of the decision maker? There is a set of behavioral issues that we do not understand as well as we could on what the motivating factors are that tend to cause ridesharing programs to be successful. There was talk about various types of profiles of individuals and organizations that have successful ridesharing programs.

IMPACTS AND EVALUATION

Second, there was a lot of discussion on impacts and evaluation. What are the impacts of ridesharing on the employee, the employer, and the public sector, as well as on the community and the public sector at different levels? There is a feeling that there is a real need to monitor costs and benefits and that the monitoring process should be on a continuing basis and, I suspect, that monitoring is probably a better term than evaluation.

The observation has been made that even some very basic information is not known at this point—basic information in terms of fundamental accounting, ridesharing programs, development of adequate performance measures, and the development of impacts and impacts in a much broader sense than we have tended to look at them in the past. For example, a number of people made the point that ridesharing programs do have an effect with regard to questions of tardiness, questions of absenteeism, which do have definite economic implications for the organization.

A continuing thread that seems to run through all the discussions is that the private sector should be more involved. Question: Is the private sector ready to be more involved? Everybody feels it should. Can it be done on an economic basis? If it cannot with existing economics, how, if at all, can one change the economics? Just what are the economic realities at this point in time? In the past, have we tended to look at the economics in too narrow a sense?

Wrong measures can have very perverse impacts and we have to be very careful about what information we collect and how we use it. Example: The most obvious measure of effectiveness is to take the cost of a program and divide by the number of pools that have been formed; this gives you the cost-effec-
tiveness of your program. Two points were made about this measure of effectiveness. First of all, it tends to encourage public organizations to keep their own pools as opposed to encouraging private-sector organizations to develop pools that might not be counted under the public sector's quota. Second, it might very well cause one not to implement pools in areas where the payoff might be minimal in terms of numbers, but quite significant in terms of a whole set of goals and objectives. So, one has to be very, very careful in terms of the information that is being used.

Researchers must perform evaluations and provide information that is relevant to decision makers and program managers. Too often the evaluations have been of interest to the researchers but of only secondary interest to the decision maker.

Everybody agreed on the need for improved information dissemination to get out results and the point was made that this is particularly necessary in a field where so many things are happening so quickly. I think everybody observed that this kind of thing is always said: but we really mean it, the point was made that this is particularly necessary. What is the long-term incremental demand of organizational ridesharing on top of ridesharing that would occur naturally? What is required to realize that organized demand? Is the investment justified when compared with other transportation investments in an era of scarce resources or should the investment be made at all anywhere in the transportation sector?

I must say that no one had raised this question. I gather that Alan Altshuler in his speech on Monday night raised some questions as to really how important ridesharing is and, therefore, how much resources should we spend on it.

What is the impact of changing demographics on ridesharing and what impact does ridesharing have on demographics, land use, and urban development? Example: Does ridesharing cause urban sprawl, respond to urban sprawl, or does it really matter very much at all? Can ridesharing be used as a tool in economic development and urban revitalization and, if so, how? Who are the people who bring that about?

What are the implications of uncertainty and shocks on ridesharing? This was a specific question in terms of energy shortfall situations, of which there have been two. What will the needs be and what are the potential ridersharing responses to future energy emergencies? Are we prepared and what should be done to prepare, if we are not?

How do we deal with uncertainty in a whole lot of different dimensions, of technological uncertainty? What types of cars will we have? Will commuter cars actually emerge? What will the energy efficiency of cars be? Will that affect ridesharing in a positive or a negative sense? There is uncertainty with respect to public expenditures for transportation; uncertainty with respect to disposable income with a whole lot of demographics in terms of how much people will have to travel; and uncertainty with respect to what the implications of communications might be and a whole lot of changes going on of a societal nature. Will they increase or decrease the need for travel? How do we plan and manage under uncertainty, recognizing that it, in fact, exists?

ROLES AND RESPONSIBILITIES

There is a whole host of questions relating to organizations' roles and responsibilities that occurred in three dimensions—first, the question of redefined public roles in terms of responsibility between federal, state, and local governments; second, the balance between public and private roles with emphasis on the private sector; and, third, employer-employee relationships and roles.

If we look at the public sector, one could envision at least two scenarios at the local level. One scenario is that in which the public ridesharing organization broadens itself to encompass a whole series of transportation system management (TSM) strategies and ridesharing serves as the base to expand upon; and/or, given the crisis and cutbacks in public transportation, the ridesharing agency assumes more of a role relating to public transportation. This is a scenario that brings together, if you will, TSM, ridesharing, and conventional public transportation.

A second scenario several people raised was one in which the ridesharing organization has a more diminished public role and, in fact, in which the public role was at best a catalytic or supportive role with more and more responsibilities shifted from the public over to the private sector.
the developer playing an increasingly key role and
that there is a series of tools that can be very ef-
fectively used, such as zoning, land use, and park-
ing policies to support ridesharing. In fact, ride-
sharing could be used to further the development
process in a way that might not have been possible
if one used conventional measures. Questions were
raised relating to how an employer develops an over-
all transportation strategy using parking, flexible
work hours, employee benefits, and that we are look-
ing at more than simply carpooling and vanpooling
programs.

There was a whole series of discussions on third-
party organizations and should they be private, not
for profit, or should they be private for profit and
should they be supported out of public funds? Should
they be cooperative, supported by private
employers? Just a whole lot of different possibili-
ties and scenarios.

These questions led to a more fundamental ques-
tion and the term "social contract" was thrown
around with the question here being, Is there a new
social contract emerging with respect to roles and
responsibilities of organizations? The inference
was that we have gone about things in a fairly tra-
ditional way with our highway programs and our tran-
sit programs. Now, there are going to be different
actors, or organizations concerned with funding,
planning, management, and service delivery, and, to
a large extent, ridesharing is at the tip of the
iceberg. It is a leading indicator of some of the
opportunities, some of the changes, that will occur,
and we ought to look beyond the concept to the much
more profound and significant implications with re-
spect to organizational roles and activities.

PROFESSIONAL TRAINING

There was a great deal of discussion on the needs
and skills and the mechanisms to train individuals
with the inference being that the traditional set of
transportation-planning disciplines, although having
some impact, might very well have secondary impact
in terms of more entrepreneurial-oriented people and
the types of capabilities those people should have.

These have been basically some of the questions
and concerns that emerged from the cross-sectional
discussion. I am sure that I missed many. I go
back in conclusion to the speech by the OMB rep-
resentative and think of how far we have come. We
are now talking about services that are understood
by decision makers. There are constituencies out
there now for ridesharing. There are many success-
ful services and models that one can point to. So,
now, to a large extent, the people who in the past
were on the outside are now the people who more and
more are on the inside in terms of influencing
change. We should be cautious not to repeat the
mistakes that people on the inside so often make--
their tendencies to become very complacent, defen-
sive, narrow, parochial, once they have gotten the
things they want. We in ridesharing, obviously,
have many opportunities; there is a need to be crea-
tive as well as realistic.

[Editor's Note: Roos' remarks were made during the
cross-sectional workshop and were based on reports
from the chairmen of the seven topical workshops.]
I would like to begin by answering a question that several of you have asked me, How is the conference going? My answer is, It has gone extremely well. Each of you is to be congratulated for an extraordinary effort.

Throughout the conference, I have had the opportunity of wandering in and out of sessions, listening to summaries from participants and chairpersons alike. From that perspective I would like to point out some common issues and trends that I have observed. Alan Altshuler began this conference with a very thought-provoking address challenging the potential of ridesharing. In making that challenge, he assumed a very specific definition of ridesharing as car, van, and buspooling.

I would like to suggest that a primary undercurrent of this conference was a realization that, while ridesharing denotes various pooling modes, it has a connotation that goes far beyond a specific modal orientation to attitudes about mobility and methods of delivering it. The potential of ridesharing can be neatly summed up in modal-split figures.

Throughout the conference, I was struck with the various expressions about the state of flux in transportation. Many of you were asking, What are the goals? Congestion reduction? Energy conservation? Cost savings? Mobility? Many expressed concern and optimism over local transportation financial crises, drying up of federal funds, and opening up of new opportunities in the private sector. And I was amazed that there seemed to be as many institutions for, and ways of delivering, ridesharing services as there were participants: transit authorities, private developers, private employers, nonprofit brokers, for-profit leasing companies, metropolitan planning organizations, city governments, and so on, with no one of them clearly superior or dominant. Over and over again we found ourselves grappling with questions much larger than just how to put two people in a car—questions that are at the heart, rather than at the fringe, of urban passenger transportation policy.

It occurred to me, as I listened to these questions, that, because of the extreme flexibility of the ridesharing mode and the fluidity of the institutional delivery system, the people working in ridesharing are at the cutting edge of a reorganization of the delivery of transportation services or changing the relationships that have existed among the provider, financier, user, and regulator of transportation services. The implications of these changes go far beyond the modes that the term ridesharing denotes.

I saw evidence of this reorganization of delivery systems and of these changing relationships in three trends I traced through several of the workshops.

The first is a series of questions that center around an identification of the role of ridesharing. What is our mission? What is our product? Are we an arm of a transit authority? Are we fleet-maintenance organizations, matching organizations, or trainers of private-sector coordinators? Are we marketing transit, parking management, and/or vanpools? Or are we marketing a transportation consulting service? And which institution is doing which of these in a given area? The fact that there were nearly as many legitimate answers to these questions as there were people is testimony to the changes that are taking place in our traditional systems. The most important role of ridesharing may ultimately be one of reordering our delivery system to more closely meet our mobility needs and our financial and technical constraints.

A second trend (or set of questions) that I observed stems from this state of change and the flexibility of ridesharing modes in dealing with individual travel needs. Many of us were asking some very fundamental questions about mobility. What needs does mobility satisfy? Are all of those needs travel related? What fears and irritations are associated with travel? How can we design our mobility delivery systems to satisfy those needs and deal with the fears and irritations while at the same time meeting some of society’s broader goals? Many of us were uncomfortable with a ridesharing research conference bearing the burden of questions that the entire transportation profession should be asking. But I realized that, before such questions can be asked seriously, there must be a readiness to make fundamental changes in our delivery system. Nowhere is such a readiness more evident than in the myriad of experiments being conducted under the umbrella of ridesharing. So perhaps these far-reaching questions are most appropriately asked here.

Finally, I noticed a set of skills questions in several of the workshops. How do we deal with pool formation and dissolution? How do we train our staff in selling? How do we allocate our budget between staff and promotion? Underlying these questions I was again struck with the observation: We are taking some very rigid delivery systems (and people) and trying to retrain them to make them as flexible and as fluid as mobility needs really are. We are trying to reshape the attitudes and skills of the people delivering transportation services and, in the process, we are reorganizing their institutions.

In response to these questions you did not call for the data and theories customarily produced by research. In fact, many of you said ridesharing was overloaded with data. Rather, you called for three interesting categories of information that may or may not be defined as research. First, amid this

Renegotiating the Social Contract: Closing Remarks

Christine M. Johnson
state of flux in our institutions, financing, and delivery systems you called for scenarios of what new institutions and delivery systems might look like, examples of new relationships that have been successfully forged, and case studies of how new relationships develop and old ones dissolve. These scenarios and case studies will serve as much needed beacons in a decade that will see a great deal of turbulence in our transportation systems and policy.

Second, you called for information and methods to help build skills that traditionally have never been found among transportation professionals but are now critical to effective performance in new delivery systems. Finally, you asked for feedback—not evaluations designed to justify your existence and funding, but meaningful information designed to help you, the ridesharing manager, improve your effectiveness.

I walk away from this conference not only with a better understanding of what ridesharing research needs are but also with an important new realization. The people using the umbrella of ridesharing are, in fact, in the process of renegotiating the long-standing social contracts among the public sector, the employer, the employee, and the transportation provider. I have been equally impressed with the rather straightforward research agenda that you have mapped out today to help carry out that renegotiation process. This renegotiation should prove vital in determining the future directions of ridesharing.
Part 2
Recommendations for Research
Research Questions and Needs

Each of the seven ridesharing workshops was charged with the task of formulating a set of research questions or needs that

1. Would contribute to the data base available to both the private and the public sectors,
2. Would enhance ridesharing as a viable transportation alternative,
3. Would guide research efforts in both the private and the public sectors; and
4. Would help to define roles, requirements, and needs related to ridesharing.

The questions recommended for research by the workshops and approved by the conference steering committee are presented here, along with highlights from the respective workshop discussions of related issues.

Roles and Responsibilities

Chairman, C.K. Orski
Recorder, P.F. Fish

J. Coleman J. Megget
N. Fox N. Peterson
D. Kulash O. Scheufian
M. Kuntz J. Sgarzi
A. Lassiter C. Shallbetter
J. McCawley

Issues

The participants in the workshop on roles and responsibilities related to ridesharing identified six overall comprehensive research objectives:

1. To gain a better understanding and appreciation of the fundamental forces behind the emerging redefinition of transportation service delivery;
2. To better understand the changing roles of the current and newly emerging actors in transportation service delivery;
3. To gain a better understanding of the existing and potential role of the private sector as a sponsor, provider, and operator of transportation services, as well as of the economics and politics of private transportation service delivery;
4. To better document these changes and to assess their implications;
5. To better understand the process of public-private partnership in transportation and the terms of these partnerships; and
6. To assist the federal government in defining its role in ridesharing.

Ridesharing is an early manifestation of changing attitudes toward transportation service delivery. These changing attitudes challenge the traditional assumptions about sponsorship and funding, provision and operations, and organization and management of transportation services.

As part of the process of redefinition of transportation service delivery, the relative roles of many of the actors are changing. They include those in the public sector—federal, state, and local governments—and in the private sector—employers, business and labor organizations, and community groups. Many urban areas are currently renegotiating their "transportation contract". They are addressing key questions such as, Who will pay for and who will assure services to the various segments of the transportation market? For example, renegotiation is occurring in central cities relative to public transportation, downtown circulation, downtown parking, and pedestrian flow. It is also occurring in the suburbs relative to providing additional road capacity as development progresses.

Part of the changing scenario involves the emergence of the private sector as a sponsor and operator of transportation services, especially for the trip to work but also for other markets.

The roles of the traditional public-sector actors are likely to change. For example, decisionmaking and service delivery are increasingly decentralized and delegated to the local level. Public agencies in response to declining resources may also be forced to assume a more management-oriented role rather than an operational one.

The renegotiation of the transportation contract at the local level is likely to result in an increasingly more formal partnership arrangement between the public and private sectors whereby transportation service delivery becomes a shared responsibility.

Current discussion at the federal level is that ridesharing can fill the gap left by the withdrawal of federal funding of many transportation services and facilities in urban areas. It is not clear, however, to what degree ridesharing can be relied on to fill all of the gaps and what role the federal government should have in stimulating, assisting, or monitoring this effort.

Recommended for Research

1. What forces are currently and likely to motivate interest in ridesharing? Will employers increasingly sponsor, provide, and pay for more of the cost of transporting employees to work as the public sector's role diminishes? What effect will reduced federal funding of public transit and local highways and tight state budgets have on ridesharing?
2. What roles will private suppliers or operators
of transportation services have in the delivery of ridesharing?
3. What barriers must be overcome to facilitate private-sector involvement in the provision and operation of transportation services?
4. To what extent is the traditional relationship between employers and employees changing, and how is this change likely to affect urban transportation (e.g., consider the employer's attitudes toward expanded fringe benefits, about including transportation as a fringe benefit, about attitudes toward work hours, etc.)?
5. Which elements of the transportation system and which functions—a ridesharing program, for example—have economies of scale and can best be provided above the local level (e.g., advertising and general promotion of ridesharing and operator selection may have economies of scale that suggest their delivery in a larger territory such as the region, while site or employer marketing and service design may best be carried out at the local level)?
6. Should there be a focal point in the public sector that coordinates transportation activities, and, if so, who should that focal point be? What role should this coordinator have?
7. Do models currently exist to spur the reassessment of transportation roles and the renegotiation of the "transportation contract"?
8. What is the appropriate role for state governments in relation to transportation service?
9. What incentives can be used to enhance public-private cooperation? What incentives enhance private commitment to transportation services through new development, particularly when the public sector is a financial partner or has substantial control over new development?
10. How effective will ridesharing be in alleviating transportation problems—especially those that may result because of the federal withdrawal of funding for public transit and added highway capacity?
11. How can federal capital assistance (both in highway construction and in mass transportation) be used to facilitate ridesharing?
12. How can the federal government use its other resources to motivate private-sector involvement (e.g., use of tax incentives)?

Productivity

The productivity or value of ridesharing may be examined at four levels. The research tasks noted in the productivity workshop are designed to identify the quantitative and qualitative benefits of ridesharing at each of these levels.

The most aggregate level is to identify the value of ridesharing in achieving national goals, including energy conservation, land use, and air quality. The second research level is to measure the value of ridesharing as it contributes to the effectiveness and efficiency of the transportation system. The contribution of ridesharing to the objectives of the employers and employees represents the third level of research, and the fourth level is to explore options to enhance the productivity of ridesharing agencies.

In the commentary below, a number of specific researchable issues are identified. However, the workshop participants did recognize that the resolution of some of these issues requires research that transcends the area of ridesharing. These issues have been synthesized into six questions and are presented as recommendations for research projects.

The major issue facing public officials is how to manage a transportation system in an era of scarcity. To make assumptions about a transportation system's changing demand, public officials want to know (a) to what extent can ridesharing programs provide increased system capacity; (b) how do the costs of high-occupancy-vehicle facilities, including intercepts, parking lots, etc., compare with the costs of preferential lanes or other facilities; and (c) what is the comparative value (capital and operating costs) of public versus private investment in transit over the life of the project? Policy-makers can only make decisions after estimating the impacts of each option. They will require information on costs and benefits to make choices. Part of this process may involve recalibrating existing models (especially of demand) to be policy sensitive.

For a transit agency, a major issue relates to how carpooling and vanpooling programs can be substituted for transit services since they are generally perceived as offering a much lower level of service than transit. There is a need to identify and understand the contributing factors of modal changes to and from ridesharing options. Transit operators have traditionally been reluctant to become involved in ridesharing programs because they do not see benefits. In fact, they may perceive a decrease in revenues and an increase in costs. Possible benefits may include shaving the peak demands and eliminating unproductive routes and services by replacing them with less costly vanpooling services. The larger issue is the value of ridesharing in maintaining the productivity of conventional transit service.

An employer needs to know what the costs are of an in-house versus an outside program. Does it make sense to concentrate on particular shares of the market? What are the costs? What is the breakpoint for large employers to provide in-house ridesharing programs? How much more difficult is it to approach different size employers? What are employer attitudes and perceptions toward ridesharing? Can they be correlated with their behavior in promoting and achieving effective programs? Can value, benefits, and costs be measured as to their effect on employee attitudes toward ridesharing? How do these attitudes relate to absenteeism, productivity, job satisfaction, commuting safety, and lost job time? Since more household members share rides than work-site members, how much more difficult in terms of time and costs is it to approach marketing from the consumer's point of view? How productive have these efforts been? While important, these questions do deal with variables that are not easily measured—a fact that, in itself, represents a major problem.

Many ridesharing experiences may not be transferable across different employers. For example, corporate responsibility to provide transportation...
alternatives such as carpooling may be viewed differently by individual employers. Ridesharing may be offered as part of an employee benefit program, yet employers may not want to include ridesharing in the benefit package because of potential union contract complications.

The issue of equity must also be examined. If employers do something for one employee or one group of employees, must they offer the same incentives or equivalent subsidies to all employees? For example, if employers promote vanpooling, should they also subsidize conventional transit, and at what cost? What labor and management decisions are involved?

Also, what costs and values are attached to various enforcement and incentive strategies—for example, traffic and parking controls? What is top management's role? How productive are ridesharing programs where appeals are made by the chief executive officer versus ridesharing programs where no officers of the company are visibly behind the efforts? Does it depend on who handles the program?

These issues depend on an understanding of the corporate structure and how it works. A state-of-the-art survey would be an effective way of researching these employer-related questions. Such a survey would help to identify similar characteristics, the rationale for employer involvement, and continued maintenance of ridesharing programs.

Residential and commercial developers are beginning to incorporate ridesharing components into their designs and plans. Research that would identify and quantify the benefits, costs, and value of ridesharing to the developers would be valuable. A survey of developers could identify their major transportation-related concerns, highlight the implications of different actions for the developer, and reveal whether a developer's program is voluntary or mandated. A survey of cities would document the types of requirements currently imposed on developers.

The ridesharing agency should be concerned with a variety of factors. How costly is it to attract and maintain ridesharers? How much follow-up activity is required? How many steps, how much time, and how do they translate into costs versus the benefits achieved by the provision of matching, carpooling, or vanpooling services?

Mechanisms of aggregation could be used to identify matching potential. This is an area that has received very little attention to date. For example, how successful are residential-based coordinators versus work-site coordinators? From the organization's perspective, are there other ways to group users that would be more productive? What tools do existing organizations use and how successful are they in increasing productivity? What are the costs of these strategies or tools, and how would productivity be affected if these strategies were not used or if other alternatives were tried?

Success and efficiency are the bottom-line issues. A survey, in terms of "how much is this alternative or strategy worth to you" (the employer, the community, and the user), would be worthwhile. The productivity level of different organizational and funding options for ridesharing agencies could be investigated to learn more about the interrelationships among the corporate variables.

A basic productivity issue for the ridesharer is, What is the value (cost) of travel time? This value will depend on the user's attitude and preferences for alternative ridesharing options versus travel by single-occupant automobile. The costs need to be balanced against the savings in terms of gasoline and other real costs. The perceived commuting cost (not necessarily the real cost) is the key. Other productivity issues from the user's viewpoint are time savings (e.g., high-occupancy-vehicle lanes), social interaction, and increased mobility within the family group.

The major factor in determining how long someone will rideshare is its convenience or inconvenience. Other factors, such as cost or not buying a second or third automobile, may force some ridesharers to continue sharing rides. Can research identify strategies for attracting and maintaining ridesharers? This information is needed now because of the anticipated reductions in the transit industry and because many transit patrons may lose transit service and may seek alternative options. Such information could be made available to users through an information and marketing effort by ridesharing organizations.

Ridesharing benefits to the general public include expanded mobility options, reduced congestion and pollution, and lower energy use. What are the costs necessary to achieve these benefits? The effectiveness of ridesharing must take into account the capacity of the existing transportation network. What are the taxing community's attitudes, perceptions, and ultimate preferences for ridesharing options? What is the taxpayer willing to pay for this? Is it realistic? Like the public official, the taxpayer needs to know what the fixed resources and sunk capital are that already exist and what the future expected costs and benefits of different transportation options may be.

Recommended for Research

1. What is the comparative value (productivity) of investing in alternative transportation modes and facilities?
2. What are the impacts of ridesharing on roadway capacity and vehicular trip generation?
3. What are the impacts (costs, benefits, intangibles) of ridesharing programs on employers?
4. What are the relationships between ridesharing and transit? What are the trade-offs to be considered in balancing services by mode?
5. What are the relationships between ridesharing and land use productivity? How do ridesharing strategies affect the comparative economic value of a given property or accommodate increased densities without parallel increased costs?
6. What are the relative effectiveness and cost of each of the alternative activities to promote ridesharing that may be taken by ridesharing agencies?
Long-Range Impacts and Issues

The workshop participants believed that the most important research topics were those that would generate information and insights that policymakers, planners, and ridesharing organizers could use both to expand ridesharing's potential for solving transportation problems and to improve the effectiveness of organized ridesharing activities. The emphasis thus was on highly usable research products, albeit in the context of a time frame in which some research findings would not be available for several years.

The participants, who used the criteria of researchability and policy or operational relevance, designated several different research areas as high priority. In some of these research areas several important individual topics were identified, while in others a single topic seemed to encompass much of what needed to be learned. The research areas (and within each, individual topics) were grouped under the major categories of demand, supply, and impacts. This approach resulted in the following categorization of research priorities:

1. Factors influencing the medium- to long-range demand for ridesharing
   - Demographic situation (household structure and size, labor force participation, locational trends, etc.)
   - Fuel price and supply
   - TSM activities and policies
   - Land use and zoning policies

2. Factors influencing the supply of ridesharing services
   - Changes in the public transportation service delivery system that affect the roles of conventional transit and ridesharing
   - Organizational evolution of ridesharing programs

3. Medium- to long-range impacts of ridesharing
   - Residential location decisions
   - Commercial location decisions
   - Changes in household automobile ownership and use resulting from ridesharing
   - Transportation infrastructure requirements

In some issue areas—for example, ridesharing's potential to serve as a complementary substitute for certain types of transit services—research bearing directly on the issue can be initiated immediately. Other issues, such as the future implications for ridesharing of changing demographic trends (e.g., increased female participation in the labor market and the trend toward smaller households), cannot be addressed until basic research explicating existing relationships among socioeconomic characteristics, situational factors (e.g., household location vis-à-vis workplace location), and other household attributes and the decision to rideshare is first carried out. In still other areas, so much uncertainty exists about both the future environment and important cause-effect relations between that environment and ridesharing that several workshop participants expressed considerable skepticism about the potential for productive research. A prime example is the effect of future energy conditions on ridesharing. Not only is the relationship among fuel price, availability, and ridesharing propensity not adequately understood—and extremely difficult to predict on the basis of past and present data—but such pervasive uncertainty surrounds all aspects of the future energy situation that any predictions would be little more than speculation.

The future demand for ridesharing will be influenced by two broad sets of factors. First, a number of background trends and events will establish the context of ridesharing, most notably (a) the demographic situation and its influence on commuter travel requirements and (b) the energy situation. With respect to the former, factors such as the distance between home and work, the relative number of automobiles and workers in households, the familial structure, income levels, and places of residence all determine to a certain extent the "natural" propensity to rideshare. Fuel price and availability will also influence ridesharing behavior and the demand for ridesharing services. The second broad influence on ridesharing demand is public policy in the areas of transportation and land use. TSM policies that afford preferential treatment on the highway system to multioccupant vehicles make driving the single-occupant vehicle more onerous relative to ridesharing, and thus can be expected to affect the demand for ridesharing. Land use policies predicated on the present low level of ridesharing, such as current parking requirements, tend to perpetuate reliance on commuting by single-occupant vehicles. On the other hand, changes in zoning regulations for parking that attempt to motivate more ridesharing are basically untried devices whose effectiveness in stimulating demand for ridesharing is uncertain. Research in each of the above areas will contribute significantly to the ability of people to understand, predict, and possibly shape the future demand for ridesharing.

Developments that affect both the public transportation service delivery system and the organizational motivations and mechanisms for establishing and operating ridesharing programs will be of major importance in influencing the future supply of ridesharing services. Major changes in the public transportation service delivery system may be on the horizon, stimulated in part by the fiscally induced service reductions many transit agencies will soon be forced to make. A key element in any significant reorganization will be a more prominent role for ridesharing specifically and the private delivery of services generally.

How organized ridesharing programs will evolve over time is the other critical supply side issue, although this also has implications for changes in the public transportation service delivery system. If ridesharing is to be effective over the long run, an organizational framework capable of sustaining ridesharing promotion and coordination at a highly active level is required. In many cases the appropriate level of activity will be the company, and thus it is important to determine how employer involvement in ridesharing programs both begins and is effectively sustained. If employer interest wanes after an initial burst of enthusiasm, what mechanisms (including policy tools) can be used to en-
courage sustained long-term activism?

In addition, it is important to determine what effect changes in the overall institutional structure for ridesharing promotion and coordination, which to date have featured an active role by government and significant use of federal and state funds, will have on ridesharing. In the context of a possible shift in funding away from federal sources and toward the private sector, the question of the incidence of benefits and costs of ridesharing programs becomes quite relevant in determining which institutions in society will be motivated to support ridesharing with funds and organization.

A number of significant impacts in the medium to long run may result from ridesharing activities. The Workshop participants noted that studies aimed at establishing the absence or presence of certain causal relationships should have a high priority. Since ridesharing's greatest market at present is among commuters making relatively long trips, it is important to determine whether stable, effective ridesharing programs influence residential location decisions. That is, do ridesharing programs facilitate urban sprawl (as well as maximize individual choice and enable workers to purchase affordable housing in outlying areas) by permitting households to settle in locations that are substantial distances from their workplace without the accompanying burdens of long-distance solo driving? Similarly, is the location of commercial developments affected by the availability of ridesharing options, or is the mode of worker access of little importance in this locational decision? A reasonable current hypothesis is that market forces are the prime determinants of locational decisions, but it is important to evaluate the hypothesis that ridesharing does have an influence, given the (a) possible implications for urban sprawl, (b) commercial developments in both low- and high-density environments, and (c) travel burdens on individuals.

Research is also needed on the medium- to long-run impacts of ridesharing on the transportation system, notably its effects on automobile ownership and use and on future transportation infrastructure requirements. Furthermore, in view of the current fiscal, environmental, and sociopolitical constraints on major transportation infrastructure development, as well as the fact that many current proposals for additional infrastructure are justified on the basis of peak-period requirements, it is important to determine whether ridesharing is able over time to reduce the need for costly investments in new (or expanded) highways, urban rail systems, or parking lots. It would be useful to know whether ridesharing, possibly in conjunction with locational shifts, has some potential to forestall the requirement for some types of new facilities, or whether other strategies must be employed to deal with the current inability to construct needed infrastructure.

**Recommended for Research**

1. What methods can be developed to determine the long-range impacts of rising fuel costs on the demand for ridesharing and transit services?
2. What are the relationships between the situational and socioeconomic characteristics of individuals and their propensity to rideshare?
3. What are the potential positive and negative impacts of transportation system management (TSM) actions on ridesharing demand?
4. What are the elasticities of ridesharing with respect to travel time and cost benefits? How do you estimate the impacts of different ridesharing-benefit programs?
5. What is the effectiveness of a tax-incentive program for employers in encouraging the establishment and long-term viability of ridesharing programs?
6. What are the relationships between peak-hour transit and ridesharing services? What are alternate development paths for transit and ridesharing agencies over the medium to long run?
7. What are the effects of the regulatory framework for privately provided commuter bus services on the supply of these services and their incorporation into the public transportation service delivery system?
8. What effects on the supply of ridesharing services and the level of ridesharing result from local zoning ordinances that relate to new development activities?
9. What is the relationship, if any, between ridesharing and the residential locations of commuters and business locations of employers?
10. Does ridesharing encourage urban sprawl?
11. What are the secondary benefits of high-occupancy-vehicle lanes and other priority facilities in institutionalizing ridesharing?
12. How does ridesharing activity by household members affect household decisions on automobile ownership and use and transportation fuel consumption?
13. Will key factors prompting employer involvement, such as parking problems or corporate expansion, sustain employer involvement over time? Are there other factors with more general appeal for stimulating employer involvement in promoting ridesharing?

**Travel Behavior and Marketing Implications**

Chairman, D.T. Hartgen
Recorder, R. Moog

G. Abel J. Margolin
W. Blanton R. Michaels
C. Carlson C. Nathanson
P. Davis F. Spielberg
I. Levin C. Staten
S. Maly B. Welch

**Issues**

In developing research topics, the behavior and marketing workshop elected to establish a broad and all-encompassing framework for any research in the area of marketing and behavior toward ridesharing. General research conditions were emphasized as a preamble to discussing specific topic areas. These were

1. Research should encourage input from diverse disciplines, and from researchers and practitioners working together as teams.
2. Research topics should be coordinated to ensure consistency in operating and evaluation data to facilitate comparisons across locations.

Although the linkage of these points to specific research topics is not made here, the workshop felt
strongly that goal-directed research would not be successful unless it is done in the spirit of the above conditions. Lack of coordination, narrowness of design, and failure to generalize are problems that have particularly slowed progress in ridesharing research.

The goal of this workshop was to review and assess the current state of understanding of ridesharing behavior and to suggest research topics for a better policy-oriented understanding of ridesharing phenomena. The workshop focused on three general issue areas: (a) understanding travel choice and behavior, (b) performance requirements and characteristics of successful ridesharing arrangements, and (c) operation and evaluation.

Understanding travel choice and behavior involves determining how individuals, corporate/agency, and community/society go about deciding on modes of travel. Current research has focused almost exclusively on individual transit choice, but ridesharing is clearly a more complex phenomenon. The decision processes of corporations or communities in reference to ridesharing are very poorly understood, particularly in reference to tightening budgets. Research is needed to develop these models of behavior and relate them to relevant policy options.

Performance requirements for successful program operation involve an understanding of such factors as behavioral science principles, cultural norms, flexibility, and ridesharing budget mix. Performance characteristics would encompass various aspects of the mode, message, and institutional features of successful ridesharing programs or arrangements. Little is now known about the attributes of failed versus successful programs, so the design of programs to ensure success is risky. Critical research needs to identify such conditions and use them in program design would be of great value in predicting the overall success of program starts and weeding out less viable proposals before initiation.

Studies of the operation and evaluation of ridesharing programs (both successful and unsuccessful) may include follow-up measures, identification of quantifiable benefits (including productivity) to the employer or sponsor, funding sources, local support, and the relationship among ridesharing agency, transit operator, parking interests, and construction or zoning activities. Research in these subjects is not extensive, and our overall knowledge base is weak.

Recommended for Research

1. What are the active variables that affect an individual's ridesharing decisionmaking process?
2. What are the potential ridesharer's expectations of ridesharing? What are the disparities between user expectations and actual travel experience?
3. What are the mechanics of making a decision to ride or not?
4. What are the benefits an employer derives from promoting ridesharing? What criteria or concerns enter into the employer's decision to initiate an in-house ridesharing program?
5. What are traits that can be used to define various segments of the ridesharing market in ways useful for the prediction of market size?
6. What is the potential for ridesharing based on home-end groups, and what is the cost effectiveness of such programs?
7. What are the characteristics of successful corporate ridesharing sponsors?
8. What makes a successful pool, and what are the ingredients of unsuccessful pools?
9. What are the attributes of a model employee transportation benefit package that defines such things as service options and costs?
10. What are the relative importance and influence of institutional messages that reinforce ridesharing?
11. What are the design criteria for back-up systems to attract new ridesharers?
12. What incentives for ridesharing will be effective in suburban work locations with free parking?
13. What are the procedures required to locate and operate rideshare parking facilities?
14. What local alternative funding sources are available to cover the costs of local ridesharing programs?
15. How does marketing increased participation in ridesharing affect individuals, organizations, and institutions?
16. What are the factors galvanizing local support for ridesharing?

Organizational Issues

Chairman, R. Mundy
Recorder, J. Collins
W. Barker T. McDonald
R. Bradley M. Neely
M. Fertal M. O’Donoghue
L. Lightbody R. Owens
E. McCarthy S. Verney

The organizational workshop discussion centered around two sets of issues: (a) internal management and (b) external evaluation and organizational relationships.

The internal questions centered on the appropriate marketing mix of products and services to offer the public. It was assumed that the ridesharing agency would offer carpooling, vanpooling, buspooling, and transit assistance; however, questions concerning percentage of efforts, phasing of mix elements, when to advocate new functions, etc., were also discussed. Internal questions regarding management qualifications, appropriate skills, and training required (for model ridesharing agencies) were raised, and finding answers to these questions was considered an important research need.

External issues focused on the broadening, placement, and evaluation of the ridesharing function. Most of the experienced ridesharing participants expressed the need for research to show how the broadened concept of ridesharing could affect an area through the reduction of traffic congestion, highway construction, parking spaces, etc. Such information would be helpful in promoting a public-private partnership for ridesharing. Others asked if there should be a partnership—i.e., should ridesharing be done entirely by the private sector, the public sector, a combination, or by none of these groups—and recommended this as an area for research.

Other external issues discussed were the coordination of transportation and related issues such as alternative work hours, TSM projects, and parking regulations. Research was suggested as a way to determine just what services or technical assistance are needed in these related areas and whether they are appropriate activities for the ridesharing agency to perform.
Finally, a combination of internal and external issues was discussed related to the effective management and planning of a ridesharing agency's resources to create a favorable climate for ridesharing with individuals, employers, and other transportation or energy agencies. It became obvious from the research needs expressed by both newcomers and experienced ridesharing experts that much descriptive data are needed from which comparative and prescriptive or normative research statements can be made. Needed are basic documents such as case studies that carefully capture the structure, successes, and failures of existing ridesharing agencies. From this research, others may compare and contrast the various approaches, tactics, and results to provide better, more efficient, and more effective ways of implementing and maintaining area ridesharing efforts.

In essence, ridesharing as an organized phenomenon is a relatively new concept with a short history. There must be documentation for the transportation traditionalists who insist they see no major results from ridesharing. At the same time, valuable management information can be gained on how to improve existing and future operations.

Recommended for Research

1. What are existing agencies doing internally? What internal and external management structures and philosophies exist? What staff skills are used? What is the role of training in staff development?
2. What functions are performed? Consider marketing, promotion, brokerage, advocacy, and long- and short-range planning.
3. What is the operating environment? Evaluate the regional demographics, political climate, social climate, business climate, and target market (profile of sizes of firms, numbers of corporate headquarters).
4. What has been the historic evolution of ridesharing agencies?
5. What were the initial criteria for success?
6. What common activities failed or succeeded? What are the correlations between these activities?
7. How did evolution of the ridesharing program relate to success or failure?
8. What did roles and responsibilities affect success or failure?
9. How did initial criteria for success affect achievement of goals?
10. What should the staffing requirements of ridesharing agencies and employers be? Compare and inventory existing staff for commonalities and effective skills and mixes (case studies).
11. How do staff requirements evolve as a program progresses from the entrepreneurial stage to the mature stage? Where can a ridesharing staff be most effective (private, public, etc.)?
12. What role can (should) training play in developing a ridesharing staff as a program develops and expands?
13. What is the role of various providers of ridesharing services?
14. Where should the ridesharing function be? What mix of public and private efforts is most effective?
15. From where should the ridesharing agency (function) evolve?
16. What "product" should a ridesharing agency offer to be most effective? What does the product consist of (organization, management, or services)? What is the product as perceived by the consumer and by the provider? How does organization relate to the quality of the product? What is the soft side (organizational) product of ridesharing?
17. What has been the response of ridesharing providers during a crisis? What plans exist for unforeseen crises?
18. How should a ridesharing agency or provider plan for the future (i.e., crisis-response planning)?
19. What was the historical development of ridesharing during World War II?
20. What lessons can be learned from a comparative analysis of ridesharing efforts during World War II and of responses to crises?
21. What is the most effective technology transfer mechanism for ridesharing innovations?

Operations

The operations workshop focused on four major themes in the area of operations that require research: pool formation, pool maintenance, fleet management, and administration.

Under pool formation the quantitative impacts of specific incentives and disincentives received the highest priority ranking. There is also a possible need here for further operational demonstrations such as those sponsored by UMTA's Office of Service and Methods Demonstrations. Matching systems were viewed as being sufficiently diverse and, therefore, not necessarily served by further research.

Discussion of pool maintenance reaffirmed the close relationship between pool longevity, termination, policy, and turnover. Support services were viewed as a priority topic. Casual ridesharing generated a great deal of interest and, as a relatively unknown area, was a clear candidate for research.

In fleet management, the group eliminated those items with the least general relevance, those that seemed least likely to produce usable research results, and those that lent themselves more readily to information dissemination rather than research. This process eliminated driver training, in-house versus vendor management, vehicle design, and vehicle lifecycles. Emphasis, they said, should be placed on the automated fleet management system, the compilation of established management procedures, and vehicle specifications.

In considering program administration, the group decided that staffing and qualifications superseded organizational housing as a priority issue. Cost-benefit analysis also rated highly and included product mix and pricing strategies. The research need identified here was a quantification of the
benefits of ridesharing as an essential tool for informing local decisionmakers and employers in support of ridesharing programs.

The participants, active ridesharing practitioners, agreed that the state of the art in ridesharing is not and cannot be static. They determined that the truly critical research questions in their topic area are those that feedback into practical solutions for daily operational problems. In addition, the group agreed that there is and will continue to be an increasing need among ridesharing programs and personnel for frequent communication, informal exchange of information, documentation of experience, freely accessible technical assistance, and professional support networks.

**Recommended for Research**

1. What are the most cost-effective pool formation techniques? What is the importance of personalization and/or followup, for example?
2. What are the measurable impacts of employer- and/or public-sponsored incentives or disincentives on pool formation?
3. Are there workable indicators to determine which clients are most apt to become ridesharers? What is the optimum pool driver-coordinator-rider profile? Does it differ for carpools, buspools, and casual riders?
4. What is the relationship, if any, of the organizational housing to the effectiveness of an employee transportation program and what internal relationships are necessary?
5. How do time and distance factors relate to the dynamics of pool formation?
6. What are the contributing factors to pool longevity, termination, and turnover? Is casual ridesharing a factor?
7. What support services are cost-effective in maintaining pools?
8. What kinds of specifications for ridesharing vehicles allow for regional and program differences?
9. What are the key cost-effectiveness measures necessary to manage a fleet of ridesharing vehicles?
10. Can the cost/benefit ratio of different forms of ridesharing to sponsors and the public at large be quantified?
11. What are the personal skills and qualifications of effective pool coordinators?

**Evaluation**

Chairman, P. Valk
Recorder, C. Heaton

D. Forkenbrock G. Miller
L. Glazer M. Misch
A. Hekimian J. Suhrbier
R. Juster H. Surratt
D. Maxwell

Participants in the workshop on evaluation chose to develop issue areas for future research efforts, rather than a well-defined list of research questions. The group maintained that each of these issue areas would justify specific research projects. These issue areas are:

1. Standardized procedures for program monitoring,
2. Survey methodology,
3. Causality and comparability,
4. Standardized measures of costs and impacts, and
5. Transferability.

Each area is briefly discussed below.

**Issues**

The principal focus of the discussions in the evaluation workshop was to identify avenues for improving the evaluation process so as to obtain better information for planning, management, and policy formulation purposes. Workshop participants concurred in the view that there are significant deficiencies in both the state of the art and the state of the practice with respect to evaluating ridesharing program costs, operations, and impacts. All felt that correcting these deficiencies was a high-priority need, if only because many of the research issues being proposed by the other workshops would undoubtedly need to be addressed through carefully structured evaluation efforts. However, since the allotted workshop time did not permit an exhaustive review of all aspects of ridesharing evaluation, the group concentrated its efforts on considering how to narrow the gap between the state of the art and the state of the practice, with only limited discussion of specific methodological deficiencies and research needs for advancing the state of the art.

The frustrating inability to develop a well-defined list of research projects in the available time resulted from the breadth of the evaluation topic. It significantly overlapped the other six topical workshops as well as had a unique set of research needs of its own. However, the group did define a number of issue areas that would justify, perhaps, several specific research projects.

Recognizing that evaluation needs and capabilities vary greatly across organizations, participants discussed the nature, purpose, and process of evaluation from the perspective of two distinct groups: ridesharing practitioners and funding or policymaking organizations at the local, state, or federal level. It was noted that ridesharing practitioners—i.e., the managers and staff members within local ridesharing agencies, third-party vanpool organizations, or company ridesharing offices—need quick-turnaround information in order to monitor their operations on a day-to-day basis and to develop modifications of operational procedures as well as periodic indicators of program costs and accomplishments to guide strategic decisionmaking and to report to their overseeing or funding organizations. In addition, practitioners are often interested in information related to operations, costs, and performance of other ridesharing organizations to assist their own efforts (what to do and what not to do). Policymaking organizations, on the other hand, have a primary need for information on the impacts and cost-effectiveness of ridesharing efforts compared with other transportation investments. Their interest goes beyond making ridesharing organizations function more efficiently and effectively to assessing the broad question of where (and whether) such organizations fit into the overall urban transportation system. A relevant question at the national policy level, for example, would concern the annual energy savings attributable to publicly funded ridesharing programs versus
various forms of tax incentives to individuals and employers. The resource paper prepared by L.J. Glazer (see Part 3 of this report) provided a useful starting point for discussions regarding evaluation needs at the practitioner level. Glazer observed that "for most ridesharing agencies evaluation is an afterthought." It is accorded low priority or not done at all, and there is little consistency in evaluation measures or methodology across agencies. The following factors were identified as contributing to this situation: limited financial resources and staff time, limited expertise in evaluation procedures, and a perception within many ridesharing agencies that evaluations are irrelevant to their operations or might possibly jeopardize future program funding. It was noted that this skepticism as to the usefulness of evaluations for ongoing program operations in part stems from deficiencies in dissemination of information from past evaluations. Newer ridesharing practitioners, who might benefit from well-digested, easy-to-understand assessments of other programs, typically have difficulty obtaining and comprehending available information. As a result, they resort to learning through trial-and-error and hearsay from other practitioners.

STANDARDIZED PROCEDURES FOR PROGRAM MONITORING

Workshop members perceived a dual need to develop practical, cost-effective, and standardized procedures for internal program monitoring (a promising subject for one or more research efforts) and to encourage ridesharing practitioners to use these procedures (an education and information dissemination activity, perhaps accompanied by formal requirements from funding agencies for performance monitoring). One particular research need highlighted was the development of standardized cost accounting procedures that would enable agencies to monitor the type and quantity of resources expended by specific activity (e.g., marketing, administration, matching, etc.). It was noted that prevailing practices for maintaining cost records are inadequate for answering frequently asked questions, such as what the most cost-effective technique for marketing to large employers is, since the cost data are often inaccurate and not at a sufficient level of stratification.

SURVEY METHODOLOGY

Another area that participants agreed warranted extensive research and promulgation of good practice was survey methodology, including sample and survey design and administration. Since surveys are the primary source of information on target market characteristics, travel behavior changes, and attitudes toward ridesharing and the program, it is important that they elicit accurate, unbiased information both from those who respond to program outreach and matching efforts and those who are exposed but choose not to respond. The group recognized, however, the existence of practical limitations on the length, complexity, and sample size of surveys administered by ridesharing organizations and felt that each of the responsibilities for surveying might better be assigned to an urban transportation systems planning agency with a broader purview of areawide multimodal travel. In that way, the ridesharing organization could focus its efforts on ascertaining the characteristics, responses, and attitudes of the individuals and employers comprising its client group.

CAUSALITY AND COMPARABILITY

Turning to the evaluation needs of funding and policymaking organizations, workshop members considered issues of causality (the extent to which observed behavioral changes can be attributed, either directly or indirectly, to the ridesharing program), comparability (the relative effectiveness of ridesharing programs versus other transportation systems management strategies or more capital-intensive uses of public funds), and transferability (the effect of individual urban area demographic, transportation, land use, and institutional characteristics on the applicability and effectiveness of various ridesharing program strategies). With respect to understanding causal mechanisms related to ridesharing behavior, there was considerable discussion regarding the difficulty of tracking people's shifts into, out of, and among different ridesharing arrangements and distinguishing program-induced changes from normal turnover. Acknowledging the possibility that exogenous factors and evolving demographic trends, such as those mentioned by Kirby and Miller in their resource paper on long-range issues (see Part 3 of this report), might well have a more significant effect on travel behavior than any ridesharing promotion and matching activities, the group concurred in the need for a few carefully designed longitudinal studies of commuters in several urban areas. These studies would be helpful in understanding the dynamics of ridesharing formation and dissolution and the impact of exogenous factors (e.g., fuel price increases, temporary fuel shortages, and transit strikes) and demographic employment trends (e.g., growing incidence of two-worker households, suburbanization of jobs and residences, and flexible work hours) on the market potential for ridesharing.

STANDARDIZED MEASURES OF COSTS AND IMPACTS

To address the funding and policymaking organization's need for comparative information spanning different types of transportation investments, the group agreed on the desirability of standardized measures of costs and impacts and improved procedures for measuring important impacts such as fuel savings. One workshop member stressed that many of the prevailing methods used to measure fuel consumption impacts are based on inaccurate data on modal shifts and fail to account for important determinants such as vehicle fuel efficiency, collection and distribution patterns, and induced changes in nonwork travel and that of other household members. In addition, there was unanimous agreement on the need for improved travel-monitoring procedures at the local level in order (a) to assess responses to various short-term transportation investments, including ridesharing program efforts, (b) to fine-tune these strategies to be more cost-effective, and (c) to plan for new, more effective packages of improvements.

TRANSFERABILITY

On the issue of transferability, there was considerable discussion regarding the process of information transfer from one program or one area to another. One participant expressed concern that there be quality control to prevent the dissemination of incorrect or misleading information. The group felt
that an organization such as TRB could play a valuable role as a quality-control checkpoint and clearinghouse for information on program operations and impacts. Another concern related to the possibility that a technique successful in one locale would be thoughtlessly applied in a very different environment but with the expectation of similar results. Workshop members agreed that this danger could be minimized if program documentation contained appropriate caveats about site-specific factors and if evaluations of program effectiveness and impacts were conducted in the context of causal frameworks.
Part 3
Resource Papers
Ridesharing: Private and Public Roles and Responsibilities

Clarence Shallbetter

One of the most controversial and difficult issues facing ridesharing in the 1980s is the question of the relative roles and responsibilities of the private and public sectors in the delivery of ridesharing services. This topic is not new. The genesis of tension that has developed in the ridesharing community is traceable to the very beginning of the current interest in ridesharing services following the Arab oil embargo of 1973 when private firms started vanpooling and public agencies started matching people. This topic is also very timely given the national debate surrounding delivery of many public services and questions about a possible shift in the public role as a consequence of the 1989 election.

The discussion about roles and responsibilities is important. A clear definition and understanding of the specific roles for both the public and private sectors and for organizations within them constitute a major portion of the policy and institutional foundation on which a ridesharing program rests. Ideally, this understanding challenges specific organizations to take specific actions for ridesharing. It also does the opposite by indicating what should not be done by some organizations or only in part by other organizations. A clearly understood framework or foundation further gives direction to individuals working in ridesharing. It provides some of the performance objectives for their job and provides some of the key expectations for these programs. It also gives consumers and suppliers of ridesharing services clear direction on where to go to buy and sell what they need.

An acceptable framework for ridesharing services and a clear definition and understanding of the roles of the public and private sectors will be extremely important to the future success of ridesharing and its ability to realize its potential.

Before discussing these questions it is helpful to look back and attempt a description of who did what in the past.

WHO DID WHAT IN THE PAST?

The marketplace satisfied the demand for ridesharing services from the end of World War II until the middle of the 1970s. People, without assistance, got together to form and operate their own carpools or individuals took mass transit if service was convenient. The automobiles used for carpooling were individually owned and operated. Almost all parking spaces or facilities at home or work were also privately owned and managed. The public role was to build and maintain the roads and a few downtown parking facilities and to regulate their use. They also regulated mass transit until the public purchased and began to operate mass transit systems.

The proportion who rode to work rather than drove alone during this period declined in the face of a tremendous growth in both the number of automobiles per household and an increase in the number and percentage who were driving alone. The move to suburbs of homes and jobs, the extraordinary increase in personal disposable incomes that enabled purchase of additional automobiles per family, and additional new street and highway capacity resulted in a substantial decline in mass transit ridership. Little is known about the proportion of people who carpooled during this period. However, it is reasonable to assume that, similar to mass transit, the high level of carpooling to work during World War II dropped off during the 1950s and 1960s.

As ridesharing became more organized in the 1970s and new products such as vanpooling appeared, a host of ridesharing providers emerged.

Employers began to provide some organized ridesharing services in the mid-1970s with the advent of employer-sponsored vanpooling and active matching services. Some of the programs from this early stage of current ridesharing include those at 3M, TVA, Conoco, Prudential, Gulf, and state employee programs in Michigan and Minnesota. The Arab oil embargo in 1973 stimulated additional interest in efforts to organize carpools. Most of these employer efforts consisted of posting ads on bulletin boards or informal searches of employee files for individuals who might be able to ride together. In a few instances, however, more formally organized efforts at bringing employees together through manual matching or even automated programs began to appear.

The 1973 oil embargo also spurred some states and local units of government—with the encouragement of 90 percent federal funding—to provide matching services for more than just their employees. These agencies ranged from highway departments to state departments of transportation in Michigan, Minnesota, and Massachusetts; city departments in Seattle and Dallas; regional transit authorities (RTAs) in Houston, Portland, Norfolk, Omaha, and Minneapolis-St. Paul; and planning agencies in Washington, D.C., and Denver.

Public and private nonprofit organizations also began to appear in a few areas as the preferred way of organizing and delivering these emerging ridesharing services. Most notably these are found in California in Commuter Computer of Los Angeles and San Diego, and later with RIDES for the Bay Area in San Francisco, and the recent Greater Hartford Ridesharing Corporation.

During this period of reawakening, the federal government began to play an increasingly supportive and active role in ridesharing. The 1974 Energy Emergency Act authorized the use of 90 percent of federal funds from urban aid for a variety of ridesharing activities by state, regional, and local units of government. Also, a set of transportation planning and programming concepts, called transportation system management, called for increased ef-
eficiency in the use of existing facilities. A variety of ridesharing services and support facilities such as high-occupancy-vehicle lanes were identified as candidates for this program. The federal government also invested in the development of some ridesharing technology including computer matching, marketing to large employers and in multimodal locations, and alternative delivery systems through its systems and research programs. The U.S. Department of Transportation (DOT) and the U.S. Department of Energy (DOE) encouraged ridesharing in publications on various topics such as how to set up a ridesharing or vanpooling program or how to handle matching. DOT also assisted with focusing attention on some critical issues in two workshops in Williamsburg and disseminated information at conferences it sponsored in Houston, Baltimore, and San Francisco. National promotional campaigns that used media public service ads were also sponsored to increase awareness.

The federal government tried to learn more about ridesharing and promoted it by funding and evaluating a few major ridesharing demonstrations, most notably in Knoxville, San Francisco-Golden Gate, Twin Cities, and Norfolk, and by studies from universities and consultants on a number of issues. These demonstrations and other efforts aided in removing some obstacles to third-party vanpool operations, eliminated possible regulation of vanpooling, and provided much information about the markets for ridesharing services. They also, however, often raised questions about who should operate these programs, ways to organize and manage them, and their cost-effectiveness.

Finally, concerned about energy supplies and cognizant of the substantial contribution ridesharing could make to a national conservation program, President Carter appointed a task force in 1979 to help with promoting ridesharing, to advise on the elimination of barriers, and to suggest incentives that would further increase ridesharing.

In summary, ridesharing over the past 35 years declined, stabilized, and possibly began to increase in the last 2-4 years. Initially, and to a great degree today, ridesharing occurs because of actions by individuals rather than the employers or public agencies. The 1970s, however, saw the rebirth of more formally organized ridesharing as we know it. These past eight years represent almost a decade of testing and experimenting, developing definitions, learning about products and markets for them, as well as beginning work on major challenges such as how to get 75 percent of the work force who work for small employers into ridesharing. In many ways ridesharing has begun to be seen as a field of work. Its importance is recognized in some national legislation and expressed in the programs of an increasing number of employers.

We are beginning to see a definition of ridesharing emerge that revolves around transportation by groups of people going to and from work most often in carpools, on public transit, and in vanpools, but also in shared-ride taxicabs and jitneys. It is concerned with the movement of people, not the vehicles they use or types of facilities on which they travel. This broad definition, however, causes tension, for example, in the treatment of mass transit and vanpools as equal partners and in the tough standards of ridership and vehicle occupancy by which program efforts are evaluated.

WHO IS DOING WHAT IN RIDESHARING NOW?

The most recent national work trip study (Selected Characteristics of Travel to Work in 20 Metropolitan Areas, U.S. Department of Commerce, Special Studies, No. 105, 1977, p. 23) concludes that 18 percent ride to work in carpools while 7 percent take mass transit and 72 percent drive alone. Today’s level of ridesharing is the result of the efforts of numerous promoters, providers of services, and vendors of equipment and specific services. These providers or vendors include the following:

1. Individuals who purchase or lease their own van or make their own carpool arrangements. These owner-operators account for the bulk of carpools—far more than any other method of formation in spite of increasing numbers of employer and public organizational efforts. There is evidence that individual owner-operator vanpools are significant and is a growing way of obtaining this service.

2. Many employers are providers of one, a few, or a broad range of ridesharing services for their own employees. These services may include carpool matching, organization of groups into vanpools, purchase and ownership of a fleet of vehicles for vanpooling, the lease of discounted vehicles and insurance for carpooling and vanpooling, operation or contract of a company-sponsored bus service, partial payment for subscription bus service, payroll deduction of bus passages, and actual transportation financial allowances for employees who ride to work or drive others to work. The extent of these efforts can be impressive as is the overall level of ridesharing reported by firms with extensive programs.

3. An increased number of public and quasi-public agencies provide ridesharing services to others including employers, employees, and the general public. These programs are sponsored by state departments of transportation, metropolitan planning organizations (MPOs), cities, and by nonprofit organizations in which public agencies are members. RTAs also belong to this group; however, they are unique as they already operate a large service—mass transit. The range of services provided by this diverse group of public agencies also varies considerably. They are typified, however, by pricing policies that supply services such as matching at no cost to the customer or at least full cost in vanpooling and mass transit. Tax-financed funding, for example, pays the administrative and marketing costs of many of these ridesharing programs or the subsidies to cover transit deficits.

4. A number of private vendors supply specific services such as matching, vanpooling, marketing materials, sales training, various types of vehicles, and general consulting. The buyers of these services are typically employers or public/semipublic agencies.

As the number of providers of ridesharing programs and vendors of ridesharing services increases, many of them bump into each other as they pursue the marketplace. Some public and private providers may actually compete with each other for customers. In a few cases there is also competition between the ridesharing services themselves given that vanpoolers are frequently former carpoolers and occasionally former bus riders.

Overall, there is considerable confusion about what is or should be the role of the public and private sectors. For example, some employers have purchased and operated a vanpool program for their employees in communities where a public agency had begun to promote its ridesharing program and its third-party vanpool operation. These employers question whether they should abandon their vanpool program and transfer all the participants to the public agency program since it is free. Other employers who have had automated matching programs for
their employees question what they should do when asked to turn over their files to a newly developing public agency ridesharing program.

Within the public sector there is also confusion and competition between agencies over specific roles in the delivery of ridesharing programs. Differences exist, for example, between the metropolitan transportation authority, the regional planning agency, an RTA, and a group of cities over who should plan and develop the ridesharing program, who should operate it, and what rules will prevail.

The lack of clarity about roles and responsibilities is further compounded by the confusion surrounding the basic ridesharing strategies. Lack of direction by some agencies in the public sector, private employers with programs, and ridesharing vendors. The lack of some agencies in the public sector, private employers with programs, and ridesharing vendors.

WHO SHOULD DO WHAT IN RIDESHARING IN THE FUTURE?

The future for ridesharing looks good in the 1980s. This forecast, however, assumes that

1. The price of fuel will continue to escalate faster than the increase in disposable income. Supply uncertainty and the need to reduce dependence on foreign supplies will also continue;
2. The transportation portion of household budgets will remain constant or increase as it did for part of 1979 and 1980; and
3. The labor supply in many metropolitan areas and in rural areas will get tighter due to declining birth rates, thus encouraging firms to use ridesharing for recruitment or employee retention.

While the future for ridesharing looks bright, this conclusion rests heavily on the recent observation that ridesharing increases when the cost of gasoline rises faster than incomes. This relationship occurs regardless of whether or not ridesharing programs are established.

Other assumptions about the 1980s need to be further explored before it is possible to suggest what might be the relative roles of the public and private sectors in the delivery of ridesharing. Chief among these is the conclusion that public resources for ridesharing are not likely to increase much during the 1980s. The number of public dollars will be more limited because of

1. Resistance to general tax increases;
2. A shift of public resources from operating programs into capital formation primarily for the private sector to increase productivity and facility replacement;
3. Transportation funding will likely remain heavily dependent on user revenues. This will particularly occur during the next few years when general fund expenditures for transportation are reduced and in spite of growing resistance to increases in user fees;
4. Federal highway funds will continue to be spent primarily on capital improvements, although they will increasingly be used for maintenance or rebuilding rather than new construction. Resistance to funding of noncapital and operating type projects such as ridesharing and public transit from these funds will continue; and

5. User fees collected from the mass transit fareboxes will increase but continue to fall far short of paying all the transit costs let alone providing funds for other ridesharing services such as carpooling and vanpooling. If deficits continue to increase, it is very possible public subsidies will not keep up and mass transit service will be cut.

Public-Sector Uncertainties

The public sector is not sure what its role in ridesharing should be in the future, where it fits in, what kind of return it can obtain from a major investment in this service, or the extent to which it should directly deliver these services if either employers or private-sector vendors are interested in doing the job.

The federal government has traditionally seen itself as funding and giving direction to transportation by setting standards for and investing in capital facilities and vehicles, e.g., highway, traffic signals, locks, airports, ships, buses, and subways. In a few cases, such as waterways, the federal role was to both build and operate these facilities at little or no cost to the users. Similarly, in recent years the federal government began to substantially pick up part of the operating deficits of public transit through capital Section 5 general funds. However, the construction, maintenance, and operation of highways are largely viewed as state responsibility while the federal government shares in funding their construction. The private role was to supply, maintain, and shelter vehicles and to fill them with passengers or goods.

This traditional arrangement poses some problems for ridesharing that in its marketing-matching activities tends to have a more operational character. Its focus is on encouraging the software movement of people rather than on hardware, such as vehicles or facilities, that are capital in nature. With ridesharing compared with air travel, for example, we are talking more about an airline-reservation-type service that is managed and provided by private air carriers or private brokers, rather than about building and maintaining airport runways or operating traffic controls, which are services traditionally provided by the public sector.

These traditional roles are slowly changing. However, these changes often appear to reaffirm traditional roles and categories rather than broaden the roles to include new programs and services. For example, a recent proposal from Secretary of Transportation Drew Lewis appears to be silent on ridesharing yet calls for phasing out operating subsidies for transit and for reductions in subsidies for waterways as user taxes are increased. It also calls for turning off federal urban aid and secondary funds, primary sources of funding for public agency ridesharing programs.

In the recent past it appeared that the federal government favored ridesharing because of its energy conservation and transportation management benefits. But it was not sure what federal action would be most helpful. Should the federal government market and sell ridesharing to larger employers? Promote ridesharing with a major ad campaign? Collect and disseminate information? Provide technical assistance teams? Train persons for ridesharing responsibilities? Provide incentives for individuals and employers to get into ridesharing? Or provide a lot of money to state, regional, and local agencies to do the job? The current approach of the federal government is to determine, at least in part, what role federal aid can play in the area.
Cant role and might better know what to do to be most effective.

Confusion about the public sector's role is equally perplexing at the level of the states, regions, and local units of government. There is no uniform pattern to the activities of state and local units of government throughout the country. Some states are doing nothing while others have almost total responsibility for ridesharing within their state and are indeed becoming the sole provider of these services. At the regional level, a few transit authorities have added ridesharing as one of their services. However, most transit authorities have not. A few MPOs have developed and operate automated matching programs and to contract for delivery of vanpool services. Again, however, most MPOs have not done this. In a few cases, MPOs have incorporated policies that recognize and give prominence to ridesharing. Others in their policies say nothing. Finally, a few cities have begun to either provide and operate ridesharing services in their community or are cooperating substantially with local business organizations in putting together and operating a ridesharing program. Overall, in spite of the increase in the number of encouragement and the number of public dollars spent on ridesharing at the state and local levels, there remains little unanimity about the respective roles of individual units of government in the delivery of ridesharing services.

Private-Sector Uncertainties

The private sector similarly is not sure what roles it might best play in ridesharing. The private sector handles the matching of people for various travel services such as the buses and airlines. It also insures people and firms against various risks and supplies many employee benefits. Some have suggested the private sector should also be brokering or selling rides for commuters and selling ridesharing as a form of insurance for emergencies or as an employee benefit. This would make ridesharing a service product of a business. One of the difficulties with this concept is that, while this brokering function might present some business opportunities, almost all the vehicles used for carpooling are owned by individuals rather than by a few firms. These individual carpool drivers often may not have the incentive to fill their car as firms would have to fill vehicles they own. In addition the rates charged for carpooling, if any, vary considerably as they result from personal negotiation that considers many variables. This lack of uniformity contributes to the difficulty of managing carpooling. Vanpools, however, have different characteristics that may make them more amenable to a business product model. If ridesharing does not become a regular business, maybe it will be more like some social service where private employers join together, create nonprofit delivery organizations, and then assist with publicity, employee solicitation, management, and fund raising.

Finally, employers face a larger issue when discussing ridesharing than just who delivers which services. This issue speaks to their historic role and relationship with their employees. Traditionally, employers simply required that employees be at work at the appointed hour. Employees had the responsibility of getting to work on their own. With the advent of vanpooling and with some carpool assistance programs, however, a growing number of employers have decided to help their employees. Others are moving to do this to save parking costs or to ensure that employees get to work during an emergency. Some nagging questions remain, however:

How much should employers do for their employees? To what extent do they have a responsibility for the home-to-work trip? And should they attempt to help employees—particularly if in doing so it enables their own employees to more readily get to work?

Public-Private Partnership

In spite of many uncertainties there is a consensus that ridesharing is a good thing and that it should be encouraged and promoted. An increasing number of voices further suggests that the way to do this is by a public-private partnership. The partnership idea appears to provide some hope for certainty and for productivity and effectiveness at a time when very few know exactly what the private and public sectors should do. This idea is also a response to the recognition that public budgets are tight and declining and therefore the public sector may not be able to afford to be a prime actor in ridesharing. It also recognizes that ridesharing will not reach its potential without a joining of employer support and commitment with employer and public resources.

Yet, the critical question today is not whether a partnership is desirable but what are the terms of the partnership? There can be little doubt that, of them calling for different institutional relationships, responsibilities, and expectations by the involved parties. The euphoria in discovering that partnership provides a means of resolving many questions, that it gives some comfort in uncertainty since the parties come together, and that it holds promise for clear direction is at best illusory. This euphoria quickly disappears with the realization that the tough work of defining the roles and responsibilities of the partners still lies ahead.

The most successful ridesharing programs not only supply a number of services, but more importantly are built on a continuing set of incentives that encourage the use of ridesharing and disincentives that discourage driving alone. These actions can be taken by employers, suppliers of services, or public authorities. In the larger context of managing transportation through ridesharing, these efforts may become much more important than who actually does the matching or the advertising or supplies the vehicles. Ridesharing may become a major way of increasing vehicle occupancy, thereby increasing the use of existing roadway capacity, of saving energy, and reducing pollution. However before this occurs there is a series of critical strategic issues that will heavily influence decisions about what is done by whom. These issues include the following:

1. Is ridesharing basically a public service that should be available to all at little or no cost? If so, it has the character of an essential public service provided by the public sector and readily available to all persons living or working in the territory served by the agency providing the service. To implement this service major appropriations of public funds will be needed. As an alternative, is ridesharing an employment-related service that also has some public benefits? In this case, it is not available to all but only to participating employers and employees—not necessarily to the general public. Here, employers are seen as the basic providers, but program costs may be shared by the employer, the employee, and the public.

2. If it is an employment-related service, the private sector through employers, employer organizations, developers, or building owners to be primarily responsible for organizing and delivering ridesharing services, how can the public sector encourage them to do it?

3. What kind of incentives can the public sector
adopt that will substantially spur these groups into taking the desired action?

4. What kinds of incentives need to be provided for public and nonprofit employers who cannot respond, for example, to tax credit incentives?

5. What kinds of disincentives might be considered that will encourage employers to establish ridesharing programs? However, most disincentives will not be warmly received and may have a limited impact unless there is a severe emergency that compels action.

6. To what extent should incentives be directed to individuals who drive others to work or who ride to work with incentives directed to employers or disincentives for persons who drive alone?

7. To what extent can rules or regulations requiring consideration of ridesharing in public plans, zoning codes, and annual or long-range work programs for capital facilities be helpful to ridesharing?

8. Should incentives be provided by federal, state, and local units of government?

Many of these strategy issues deal fundamentally with how ridesharing can be most effectively increased. The strategic choice, for example, of an incentive approach to ridesharing rather than provisions for a set public services can have far-reaching impact. Both the set of subsequent issues and the kinds of decisions that need to be made will be quite different. The important thing to remember when sorting out these questions and finding solutions is to weigh each solution in light of its relative contribution toward increasing ridesharing. This objective measurement of ridesharing results needs to be the standard by which we determine and weigh the relative benefits of these alternatives.

Terms of the Partnership: Possible Models and Relationships

Before a working partnership can develop, alternative models and relationships should be explored. This partnership can mean fundamentally different roles for the parties and possibly substantially different results.

What does it mean for the public and private sectors to be in a partnership? Does it mean the private sector should simply cooperate with public agencies that provide ridesharing services by supplying them with applicants and occasionally publicizing the service? Does it mean that larger private (and public) employers beyond a certain size should provide ridesharing services for their own employees and then move to assist employees or nearby employers? In doing this, what information and what relationship should they develop with any public agency program, particularly for those employees they cannot directly serve? If the larger employers assume responsibility for their own employees and those of nearby employers, who should assist employees of smaller employers who are not close to large employers or not aided by these large employers? Does it mean employers in the private sector should join together and sponsor a private, nonprofit ridesharing organization? Should the public be invited to join as an employer? as a supplier of services? or a supplier of funds? Does it mean public agencies should provide all of the ridesharing services for all employers, employees, and the general public?

Each of these alternatives obviously calls for a different set of expectations from the parties, establishes different relationships, requires different procedures and sometimes the creation of different institutions. Each of them may be aided or never realized, depending on the basic approach and design of national program efforts.

The private sector can have a determinative influence on the direction of the partnership and the success of a public-agency-only approach by the initiatives it takes. If the private sector moves to organize the delivery of ridesharing services, or if major employers aggressively provide the services to their employees and further extend them to non-employees, the major ridesharing organizational efforts will be within the private sector. Lacking this high level of commitment and activity by the private sector, the temptation exists to let the public sector do the job whether or not the job is one that the public sector can do well. However, there is serious question about whether the job will result in any significant ridesharing increases with the support and commitment. The selection of a model should depend not only on the local situation but respond to the question about how in-depth, sustained employer commitment to ridesharing is best obtained. Is this with a partnership in which ridesharing services are provided for them, with them, or by them?

Functional Analysis and Marketing and Operational Issues

Before deciding whether a ridesharing program should be built primarily by the public or private sector or by some combination of the two, it might be helpful to review a number of the program functions and determine which group can handle the job better or which sector possesses the needed skills. Some of the questions to be answered include:

1. Can the marketing-sales activity of a ridesharing program be done more effectively by the private or public sectors?

2. Should this marketing-sales activity be centralized within a state, region, local community, or within a work site and in the private or public sector? Or, instead, should this marketing activity be essentially decentralized to a local community or work-site organization and in the private or public sector?

3. Which markets can and will the private sector best reach and serve? Which markets are better served by a joint public-private marketing effort? Which markets can the public sector either better or only serve?

4. In the marketing activity so tied to the delivery of services in successful ridesharing programs that it must be provided by the same organization? Or, can marketing be performed, for example, by the public sector with services delivered by the private sector? Or, is the reverse better?

5. Is the matching function by its nature and available technology something that should be centralized to the most efficient or should it be decentralized within the state, region, or community to be more responsive to customer demands?

6. Is a centralized or decentralized matching service more able to respond in an energy or mass transit emergency?

7. If centralized, who should be responsible for this activity—a regional or state public agency, a consortium of employers, or a single employer?

8. If decentralized, who should be responsible—a city, county, employer organization, or single employer?

Influence of Decision Making on Partners

In setting up and operating a ridesharing program it
is desirable to know something about the marketplace, the customers, their current travel behavior, the cost of driving alone, and the cost of ridesharing alternatives. As these data are assembled, however, a number of policy questions arise relating to roles and the public and private sectors. These issues include:

1. Should ridesharing services be integrated as part of a plan, and controlled in their delivery and selection, to assure that customers take the most appropriate service consistent with the plan? For example, if the plan calls for an individual to take mass transit rather than a more convenient vanpool, should the person be required to take the bus or be denied the vanpool service?

2. This integrated plan and controlled delivery system require at least a set of rules and some enforcement mechanism. It would probably have to be run by the public sector. Yet, which public agency should promulgate the plans and exercise these controls?

3. Should the selection of ridesharing service be left to the marketplace with customers deciding which service they want to take from a variety of vendors? This choice leaves the mix of forms of ridesharing to the marketplace. It would mean, for example, that, if a person could take a carpool or a bus to work but chooses the carpool, he or she would receive carpool assistance.

These questions primarily arise when alternative public-sector ridesharing delivery models, the membership of a joint private-public organization, or a joint organization to advise a public agency that is providing ridesharing services are discussed. Interest in limiting customer selection of ridesharing modes is voiced most often by those who supply or finance these services.

Public-Sector Agencies and Roles

Apart from the difficult questions about relative roles and responsibilities between the public and private sectors, an equally thorny set of issues is posed in looking at alternative public agencies for delivery and operation of a ridesharing program. There is general agreement that the public sector at all levels should support ridesharing in its transportation policies by taking steps that will encourage additional ridesharing such as developing preferential access to freeways, setting aside diamond lanes, and establishing high-occupancy-vehicle lanes. Additional work is also needed by local public agencies to make land use, zoning, and parking policies reflect support for ridesharing with changes that reward developers and parking operators when they incorporate ridesharing in their plans and activities.

The public sector clearly has important policy, facility, and development responsibilities for ridesharing. However, if the conclusion from the discussion about the private and public roles is that the public sector should provide and deliver some ridesharing services, then the question is: Which agencies should do it? Second, who can make this governmental decision? This is a classic intergovernmental problem.

There is no good reason, if ridesharing is an extremely desirable and attractive service, why every possible public agency should not seek to provide ridesharing service to the public. After all, it is a new and attractive service at a time when more traditional programs are often shrinking or finding they no longer have a broad constituency of users. The dilemma, however, is that there is no institutional that can clearly make the choice between potential public delivery organizations. In addition, there is no agreement on how this should be done.

The federal government, for example, cannot pick and choose between public agencies and regional or local units of government. Instead, it must rely on the states or funding organizations within each state or region that allocate local federal highway funds to do this job. The federal government, however, may influence this decision by means of requirements or eligibility standards attached to its funding.

States, on the other hand, have the power to decide but are often politically paralyzed in the struggle among state departments, regional agencies, and local units of government. Some suggest an urban region is the most appropriate level for these programs and that the MPOs or RTAs should deliver the services while others suggest cities or counties should do it. In some locations there is a struggle between the MPO and the RTA or between one or the other of them and the local units. Finally, cities and counties may be increasingly inclined to become delivery organizations on their own in their local community.

When establishing a ridesharing program, the costs, time and success of mechanisms to resolve these intergovernmental struggles need to be considered particularly in view of an alternative that is to leave the delivery of ridesharing services to the marketplace.

Optional Methods of Service Delivery

Even as public agencies decide that they will provide or deliver ridesharing services, or when specific public or public-private agencies are deemed appropriate to do this, they should proceed with considerable caution and flexibility. They should look toward contracting for these services, including marketing and matching, before they decide to deliver these services with their own employees. This contractual approach permits considerable flexibility by different groups and by using different techniques in delivering services. Contracting also allows public agencies to obtain personnel trained or knowledgeable about ridesharing rather than retraining employees from totally unrelated job areas. One of the difficulties of leaning on some public agencies for delivery of ridesharing services today is that they are tempted to use a number of public employees for a ridesharing program who otherwise might be laid off as traditional programs shrink and old jobs vanish. Finally, the contractual approach allows the agency to either expand or reduce activities in response to both the market and the experience to date.

In delivering ridesharing services agencies should initially concentrate their efforts on defining what they want and the expected results regardless of how they deliver the services. This initial effort will set up performance objectives that enable the agency to become an effective buyer of services and an evaluator of what has happened as the service is delivered.

CONCLUSION

The relative roles of the private and public sectors will vary from one place to another. The actual public and private actors will also vary. Nevertheless, it is important that a thoughtful, conscious effort be made to develop a sound set of ridesharing strategies and to think through the terms of a partnership.

The subject of roles, responsibilities, and
Two Ways of Thinking About Productivity and Ridesharing

David W. Jones, Jr.

Ridesharing organizations, like other tax-financed agencies, are under pressure to produce results and produce them at a reasonable cost. The question this paper addresses is, What knowledge, gleaned from research, could help ridesharing organizations increase their productivity?

Before addressing this question, we need to pose a more basic one: Do ridesharing organizations have a productivity "problem"—and, if so, why?

PRODUCTIVITY AND RIDSHEARING

The managers of ridesharing programs say they do have a productivity problem and they characterize it in terms of low closure rates. A closure rate is the number of persons placed in carpools or vanpools relative to the number requesting assistance and the still larger number offered assistance. So there is a perceived productivity problem, and it is reflected in the fact that the number of carpools and vanpools actually formed is disappointingly low compared with the number of requests for assistance and the number of tripmakers offered assistance. Program evaluation data support this perception.

Why do ridesharing organizations have a productivity problem? My answer is a controversial one. I believe the pressure to produce results has hurt productivity. Ridesharing organizations might be more productive if they were under less pressure to show results.

This proposition is more reasonable than it sounds if we distinguish between short-run and long-run results. The typical ridesharing organization—for reasons of funding—is under pressure to produce short-term results. It does not usually have the luxury of laying the groundwork for long-term results even if those results would be larger and the effort eventually more productive.

Let me distinguish between (a) the current practice of managing for short-term results and (b) what I think would be involved in managing for long-run results and higher productivity.

Managing for Short-Term Results

The quarterly and annual reports of ridesharing organizations typically report

1. The number of vans placed on the road,
2. The number of carpool applications in the agency's match files, and
3. The number of companies and institutions requesting and receiving matching services.

Those that use surveys to audit their results also report estimates of gasoline saved, pollution averted, and travel expenses avoided.

The performance and productivity of ridesharing organizations are judged by numbers such as these; thus, program managers are motivated to increase the volume of transactions in which the agency is involved: for example, employer contacts, placement requests, and names in the match file. One strategy is to increase output (carpool and vanpool placement) by increasing input (requests for placement). This is usually accomplished by increasing the pace of employer contact and streamlining the procedure for disseminating, collecting, and coding requests for carpool-matching assistance. A second strategy is to increase output by improving service. This usually means reducing the time lag between a request for matching assistance and the provision of that assistance, usually a computer listing. Some agencies also think about the quality of service in terms of the proximity of carpool trip ends, and they have tried to improve the quality of their matchlists at closer geographic fitting. Still others emphasize computer file updating to improve the quality of the matchlist in terms of its timeliness.

Thus, many ridesharing organizations are trying to improve their quarterly and year-end results by increasing the volume and velocity of their operations. In turn, most organizations focus on improved computer operations as their strategy for increasing throughput.

The quick-in and quick-out efficiency that can be achieved in servicing either individuals or organizations is both extraordinary and seductive. And, given the pressure for short-run results, quick-in and quick-out efficiency becomes a matter of organizational pride and a central organizational goal.

Unfortunately, there is little evidence that such efficiency increases the rate of closure, although it can increase the number of pools formed. Increasing throughput masks the productivity problems of ridesharing organizations; it does not solve them.

How then can closure rates be improved? The answer may lie in less volume and slower velocity.

Developing a Long-Run Commitment

The managers of most ridesharing agencies agree that employer-based campaigns are their most effective operations. They also agree that the most effective results can be obtained when employers commit to a sustained placement program rather than a one-shot matching effort. But in dealing with employers, most ridesharing organizations operate in the mode
of quick-in and quick-out efficiency rather than in-
vestigates the time necessary to (a) negotiate a policy-level commitment to ridesharing within the
workplace; (b) develop a plan for sustained corpo-
rate action, a plan that includes the subtle changes in personnel policy necessary to make ride-
sharing programs effective; and (c) equip company
personnel with the expertise and the arguments
necessary to implement the plan. I suspect the managers of most ridesharing or-
ganizations would respond: "That would be ideal—if
you could get that kind of commitment. But be re-
alistic, you're lucky when you can get as much com-
mitment as we do." This quote could be attributed
to the manager of virtually any ridesharing organi-
zation across the nation. What they really mean is,"That would be ideal—if you could get the commit-
ment. But we don't have the time to build that com-
mitment." Time pressure is the nub of the ride-
sharing productivity problem. The pressure for short-run results commits ridesharing agencies to
quick-in and quick-out efficiency rather than the
painstaking, time-consuming effort necessary to cul-
tivate a committed constituency for ridesharing.

The development of sustained workplace involvement in ridesharing simply does not square with the ride-
sharing organization's need to make annual or quar-
terly reports that track, sum, and take credit
for vans on the road, matchlists supplied, and or-
ganizations serviced. Pools formed this quarter,
note five-year accumulated totals, are the statistics
that serve the organization at budget or contract
renewal time.

From experience in the San Francisco Bay Area, I
know that it is possible, with painstaking effort,
to build a workplace commitment to ridesharing.
Documented efforts (1,2) in San Francisco, Santa
Clarita County, Livermore, and Berkeley indicate that
sustained corporate programs can reduce the num-
ber of vehicles brought to work by much as 30 percent
over a period of two to three years.

The programs that have achieved the largest im-
pacts have the following characteristics:

1. They are managed by a transportation coordi-
nator on the company or institution's payroll.
2. They focus priority effort on new em-
ployees—employees who have not yet established a
driving habit, at least at this place of employment.
3. They embrace the philosophy that placing one
employee in a carpool, vanpool, or bus each day will
accumulate to a significant change in aggregate be-
havior over a relatively short period of time.
4. They provide premium parking spaces for pool
vehicles, which offers an incentive to pool and an
opportunity to compile a registry of pools with
seats available.
5. They emphasize personalized placement rather
than computer matching (they are computer assisted
rather than computer-driven).
6. They adopt flexible working hours that allow
employees the schedule latitude necessary to arrange
a convenient carpool.

7. They cultivate a "courtesy ethic" that dis-
courages last-minute meetings or assignments that
would disrupt carpooling.
8. They conduct continuous awareness campaigns
at low cost by piggybacking other information media
within the workplace.
9. They rely heavily on the services of
RIDES (Rideshare Information and
Coordination). The regional rideshar-
ing organization, during the program's start-up,
but then developed more customized, personalized ap-
proaches as the program matured.
10. They are motivated by corporate or institu-
tional self-interest and the program has been sold
to management on those terms.

This organizational model of ridesharing has been
embraced by the San Francisco Bay Area Metropolitan
Transportation Commission (MTC). Working through
local commerce and industry associations, MTC is
persuading employers to appoint in-house transporta-
tion coordinators. MTC then trains the coordinators
to manage and market a comprehensive "commute-alter-
native" program. To date, almost 75 transportation
coordinators have been appointed and trained. These
coordinators are now using RIDES's computer place-
cent and vanpool leasing services as functional ele-
ments of broader traffic and parking management
plans. The quick-turnaround capability of RIDES is
an asset in this respect.

As time-consuming and painstaking as it is, I
suspect the constituency-development model of ride-
sharing is a better formula for productivity than
the volume and velocity model. But given the cur-
rent state of research, I can only say that I sus-
pect that is the case. In my judgment, the most
important research that can be undertaken in ride-
sharing would involve a systematic, multiyear as-
sessment of the accumulated returns produced by the
two organizational approaches.

Such research could and probably should be con-
ducted in the context of a demonstration project
that documented the benefits of a ridesharing cam-
paign organized as a "pure case" of the constituency-development model. Short of that,
it would be appropriate to document and analyze the
results of employer-based programs already under
way; many of those programs are poorly documented
due to the Urban Mass Transportation Administration
(UMTA) Service and Methods Program has neglected re-
search that is not coupled with UMTA-funded demon-
stration projects. The critical questions to be
answered are, How much corporate commitment can be
generated, at what cost, and with what results in
terms of accumulated, multiyear reduction in travel
expenses, vehicular traffic, fuel consumption, and
pollutant emissions?

A closely related research question is, What
agencies or actors are best equipped to generate em-
ployer involvement and commitment? I suspect the
answer is city governments rather than regional
planning agencies or areawide ridesharing organiza-
tions because city governments can build traffic
mitigation into their permit and zoning review pro-
cesses. I think this is another hypothesis worth
testing through research and demonstration projects.

Finally, there is a crucial area of research that
is needed to stimulate corporate involvement in
ridesharing and broader traffic mitigation efforts.
Little is known about the impact of ridesharing on
the productivity of the workplace, the job satisfac-
tion of employees, or the quality of working life.
Evaluations of ridesharing have focused on ob-
jectives salient to the U.S. Environmental Protec-
tion Agency, the U.S. Department of Energy, and the
U.S. Department of Transportation. Impacts on these
dimensions are not particularly salient to workplace
management and are therefore not very useful in
generating employer commitment. The impacts that
are salient include those on the costs of operating
a program; potential liability exposure; quantity of
the labor force that a company can recruit and re-
tain; absenteeism, turnover, tardiness, and workday
erosion; ability of the organization to maintain
production in the face of external contingencies
such as a petroleum shortage or a transit strike;
work that can be obtained from employees, including
both paid and unpaid overtime; quality of customer
service; employee loyalty and job satisfaction;
parking space requirements expressed as initial and
recurrent costs; disposable income of employees ex-
pressed as after-tax salary equivalents; quality of
customer service; and quality of corporate relations with government agencies and neighboring residents.

These impacts are researchable, although they are not within the ambit of conventional transportation expertise. Nevertheless, they deserve the highest research priority and funding from transportation agency budgets. At the strategic level, such research is necessary to generate committed corporate involvement in ridesharing. At the more fundamental level, such research is necessary to understand the complex ways in which transportation is valuable to society—how it influences the quality of working life and the methods, quality, and profitability of production. In a very basic sense, such research should form one of the basic measures of the productivity of ridesharing and of other transportation investment and development strategies.

PRODUCTIVITY AND THE TRANSPORTATION SYSTEM

In the first part of this paper, I explored the productivity of organizations formed to promote ridesharing. This part of the paper takes on a more difficult task: exploring the contribution that ridesharing can make to the productivity of the transportation system. The difficulty arises from the problem of giving meaningful definition to the concept of transportation system productivity.

Most efforts to measure and then trend the productivity of the transportation system have emphasized facility-oriented measures, such as vehicle or person throughput per hour. Such ratios are frequently used in engineering analysis. Predictably, throughput increases as traffic volume approaches facility capacity. As volume exceeds a facility's service rate, queues form and congestion builds; throughput stabilizes at the service rate but delay increases.

The traditional engineering response has been to expand system capacity by adding lanes or building a parallel facility. More recently, efforts have been made to increase throughput by encouraging the use of high-occupancy vehicles—carpools, vanpools, and buses. This has been accomplished by reserving freeway lanes for the exclusive use of high-occupancy vehicles or by treating buses and carpools preferentially at metered freeway ramps. The time advantage offered by preferential treatment provides a mild incentive for ridesharing.

Person throughput is a partial measure of transportation system productivity, because it deals with only one element of the transport system, freeways, and only one dimension of system efficiency, the service rate. As a result, it can be a misleading measure of system merit. Our intent is to search for a broader, and, it is hoped, more meaningful, definition of productivity. The approach will be unabashedly philosophical rather than technical.

We begin by asking a basic question: What is the product delivered by the transportation system? Throughput is one of its products, the specialized product of higher-order facilities. But the transportation system as a whole is hierarchically specialized to deliver a variety of products.

Hutchinson (3) offers a useful hierarchical classification scheme that distinguishes the service functions of expressways, arterials, collector streets, and local neighborhood streets:

1. Class 1: Expressways—provide for high volume and relatively fast movements to and from major activity concentrations that depend on region-wide support; traffic movement on these facilities are grade separated without direct land access and movements between different road facilities are achieved by interchanges;

2. Class 2: Arterials—provide for the movement of trips between freeways and collectors where use of traffic movement is emphasized and little or no direct access to land is provided; intersections between arterials, and with collectors, are usually at grade and signalized;

3. Class 3: Collectors—provide for the movement of trips between arterials and locals and provide some direct access to land; and

4. Class 4: Locals—provide for the distribution of traffic within activity areas where the emphasis is on the integration of the road with the land and where the speed of movement is deemphasized.

Hutchinson's classification, like many employed in transport engineering, emphasizes traffic service. I prefer an ecological approach, using the word as sociologists do. The transportation system performs multiple ecological functions.

1. Freeways and expressways increase the reach of travel and quarantine large volumes of through movement. They deliver two products: reach and quarantine.

2. Arterial streets serve a more complicated function. They provide access to commerce and industry; they provide for the circulation of vehicles, pedestrians, and perhaps bicyclists; they provide passage for vehicles with destinations elsewhere; they provide storage for the vehicles of employees and customers; and they provide a commons for conversation, window-shopping, congregation, bag lunches, and the like. Thus, arterial streets may deliver as many as five products: access, circulation, passage, storage, and congregation.

3. Neighborhood streets provide access to homes. They are also a commons that is used for play, neighboring, and strolling. They deliver two primary products: access and commonspace.

When we think about the productivity of the transportation system, we should ask how productively it serves all of these functions, not just traffic service. No simple metric or family of metrics can measure productivity, but it can be defined in the collaborative processes of community planning. This is not a cop-out, but a recognition of fundamental value conflicts in the use of the roadspace environment.

Many transportation issues in recent years have their roots in conflict over the use of the roadspace environment, the “dumping” of express traffic on arterial streets, and in the invasion of lower-order systems by traffic operating according to the rules of higher-order systems (e.g., speedign, taking shortcuts, and littering). It is in this context that maximizing throughput can be a misleading rule for productivity gain. It may increase the productivity of higher-order systems but may overload and thereby reduce the productivity of lower-order systems that perform basic functions that are more complicated, diverse, and fragile.

Massive resources have been mobilized to build freeways and to solve the problems of reach and quarantine. The more complicated problems of the arterial and neighborhood street environment have, by comparison, suffered comparative neglect. If there is a productivity problem in the transportation system, it may not be throughput but an imbalance of effort. Parenthetically, it is appropriate to note that the imbalance would be compounded under the Reagan budget that proposes to eliminate federal assistance to transit operations and the Federal-Aid Urban System.

I think it is fair to say that ridesharing organizations have not had a significant impact on...
vehicle occupancy in the aggregate. Nor can we expect them to in the future. Ridesharing, whether promoted by rider placement or preferential treatment, can make freeways work better. But the degree "better" will be marginal. We can conclude outright that ridesharing does not offer a substitute for capital investment in highways and freeways in urbanizing areas. In already urbanized areas, it may allow transit agencies to avoid some of the marginal cost of additional peak-hour service. But expenditures for ridesharing cannot replace first-time expenditures for capital facilities. This does not mean expenditures for ridesharing are unproductive. Ridesharing can enhance both the reach and quarantine functions of the freeway system. The lower cost of ridesharing increases the reach of the system effectively open to its users. And reduction in on-freeway congestion can help perfect the quarantine function of higher-order facilities.

I suspect ridesharing's most important contribution to transportation system productivity is not and cannot be at the scale of the freeway system but rather at the scale of the commercial district and the major employment center (where targeted effort can produce concentrated results). Ridesharing can play a significant role in managing two problems mentioned earlier: use conflicts in the environment of commercial-industrial districts and the dumping of express traffic on arterial streets. In fact, preferential treatment of high-occupancy vehicles on freeways should be evaluated not only in terms of throughput, but also in terms of its spillover value for community-service roadspace. (By the same token, some ramp-metering schemes should be viewed skepticaly because of traffic diversion and the consequent violation of the quarantine principle.)

How might ridesharing offer a strategy for dampening use conflict in the environment of commercial districts and employment centers? It can free parking space now required for the storage of commute vehicles. It can reduce the spillover of parking from commercial districts and employment centers into adjoining neighborhoods. It can reduce the circulation frequently necessary to find parking. Consequently, it can reduce conflicts between circulation and passage, as we defined them above. To the extent passage is perfected on arterial streets, one can hope for a modest reduction in traffic shortcutting through residential areas.

Ridesharing agencies have not usually conceived their mission in these terms and, as a consequence, have not cultivated relationships with the planning and traffic engineering departments of local governments. I suspect that the effort of ridesharing agencies should be focused in this environment for it is here that a targeted and concentrated contribution to system productivity might be achieved.

As in the first section of this paper, I have used the phrase "I suspect" to hedge an assertion. Research is needed to confirm or reject the proposition. There is little research that documents the parking and traffic management value of ridesharing in the environment of arterial streets and activity centers. This is further evidence of imbalanced effort and the neglect of research, planning, and investment with an activity-center focus. That neglect should be corrected in the research and demonstration agenda recommended by this conference.

REFERENCES


Ridesharing services have grown from relative obscurity and neglect in the early 1970s to become the subject of national publicity and promotion in the 1980s. Over the last decade, the pressures of increasing fuel prices, occasional fuel shortages, and tighter funding for conventional transit services have greatly increased the demand for, and policy interest in, carpools, vanpools, and subscription services. The highly publicized success of certain ridesharing projects such as the Tennessee Valley Authority's (TVA's) carpool and vanpool program, the 3M and Golden Gate vanpool programs, and the COM-BUS subscription bus program has encouraged a number of other large firms, private bus companies, transportation authorities, and communities to initiate ridesharing programs. The promotion and information dissemination activities of the U.S. Department of Transportation (DOT) and several state departments of transportation have also contributed greatly to the increasing interest in ridesharing options.

Evaluations of ridesharing programs have focused primarily on measuring short-run mode shifts from the single-occupant or low-occupant automobile modes to higher-occupancy carpool, vanpool, and subscription bus services. The benefits of ridesharing programs have been quantified in terms of reductions effected in overall vehicle miles of travel (VMT) and in out-of-pocket cost savings to users of the ridesharing services. Reductions in VMT have often been transformed into gasoline savings and air-quality improvements. Savings in parking space requirements have also been credited to ridesharing programs in some cases.

The estimation of the benefits derived from ridesharing programs must be viewed with considerable care because of a number of technical considerations that complicate the measurement process. The most important of these considerations are as follows:

1. The impacts of ridesharing programs must be measured against a well-defined base case. In some evaluations, benefits and costs have been computed
against different base cases (as when, for example, costs are computed against a base case involving building an expensive parking garage and benefits are computed against a do-nothing case).

2. The distinction between user benefits and out-of-pocket user cost savings must be recognized. Employing user cost savings as a measure of user benefits often overstates user benefits (as when, for example, users switch from a high-cost, high-service mode to a low-cost, low-service mode; user cost savings may be substantial, but net user benefits may be quite low).

3. VMT generated by vehicles left at home as a result of increased ridesharing must be counted as partly offsetting the VMT savings achieved for the commute trips. Unfortunately, measurement of this generated VMT is difficult, and current estimates of its magnitude vary greatly.

4. The impacts of ridesharing programs over time must be taken into account through proper discounting of benefits and costs; through estimation of longer-run impacts of ridesharing on activity location, automobile ownership, and transit supply; and through assessment of external influences on the market for ridesharing.

Although the first two of these four considerations are procedural points that can readily be incorporated into any evaluation, the second two considerations cannot be taken into account so easily. In these cases, estimates are required for influences and impacts about which current data are at best sketchy and at worst nonexistent. Since these factors must be taken into account if credible evaluations and predictions are to be obtained, additional research about them is needed.

This paper defines two areas of special interest with regard to ridesharing: the external factors that influence the overall demand for and supply of ridesharing services; and the secondary and longer-run impacts of ridesharing services on decisions regarding automobile ownership and use, activity location, decisions, and the supply of transit services. These two categories are discussed in turn in the following two sections, and specific research challenges for each of the categories are presented in the last section of this paper.

FUTURE ENVIRONMENT FOR RIDEHARING

The future demand for and supply of ridesharing services will be affected by a number of factors over which those directly involved in ridesharing have relatively little control. Recognition of these factors and a general understanding of them are essential, however, for planning and policymaking. The demand for ridesharing is likely to be affected by the demographic and migrational trends of urban populations, commercial location decisions, the price of fuel and the fuel economy of the automobile fleet, parking policies at employment centers, and the availability and price of conventional transit services. The supply of ridesharing services will depend on the availability, price, and performance of the various kinds of ridesharing vehicles (including buses, vans, and automobiles); on the regulatory situation; and on the level of interest of the potential organizers of ridesharing programs, particularly large employers.

Demographic and Migrational Trends

Recent studies of demographic and migrational trends in the United States have made a number of forecasts that have important implications for the future demand for ridesharing. Perin [1], for example, concludes that a number of trends in household structure and activity deserve careful consideration. Of particular interest are the increases in labor force participation by women, and the high rate of growth of single-parent, single-person, and two-worker households. Some specific impacts on ridesharing demand are suggested by this study.

1. "Women's trips in peak periods are likely to increase significantly, and, as now, a large proportion may be taken in family carpools. But for working women with children and household obligations, their trips may be less amenable than men's to either ridesharing or public transit."

2. "Single-parent households generally find owning and operating autos expensive, especially due to the great majority of single-parent women who tend to have lower incomes."

3. "Single persons want to reside in multi-family housing or rental units, which require less maintenance, are more affordable, and are located generally closer to the downtown than are single-family detached dwellings."

4. "Ride access and auto ownership will be important factors no matter where two-worker households settle, but judging by the long-term trend data, correlating family income with lower density settlements, where there is even one child, these households are likely to have a strong propensity toward suburban residence."

A study by SG Associates and the Urban Institute [2] comes to the following conclusions regarding trends for the next two decades:

1. "The bulk of projected population growth is forecast to occur in suburban jurisdictions....Given that suburban transit is expensive to provide....the only near-term option is ridesharing."

2. "Ridesharing plus more efficient cars are forecast to stem the increase in motor fuel consumption for ten to fifteen years, but our national consumption is already so high that the long term energy prospects are not good."

3. "Rising energy costs...could have the effect of creating an economic burden for residents of rural areas who commute to work in urban places."

4. "The most rapid growth will be in the 'sunnybelt' states where "transit services will be more costly to provide.""

5. "Nationwide there still will be extensive areas of low density development where paratransit options will be the only economic alternatives to single occupant auto use. Ridesharing in carpools, vanpools, taxicabs will be the most cost-effective transportation option."

The Urban Futures Idea Exchange [3] reported recently that "the growth of non-metropolitan areas...is occurring at an even more pronounced rate than population experts expected." This trend is attributed to "the relocation of industries, businesses, services, and educational institutions into once remote areas....The movement has been facilitated by the ease of long distance travel and communications." These forecasts suggest that there should be a strong demand over the coming decade for modes like ridesharing that can serve fairly long-distance commute trips at low cost. Continual growth in suburban and nonmetropolitan areas should provide more of the kinds of commuters who have found ridesharing attractive to date. If these trends are maintained, interest in ridesharing should continue to increase. If concerns over the price and availability of fuel were to heighten sharply, however, the dis-
tance between residence and workplace could become a much more important factor in location decisions, and the predicted trends toward more long-distance commute trips might not materialize.

Fuel Prices and Automobile Fuel Economy

The studies mentioned above support the widely held view that fuel prices will continue to increase significantly in real terms for the foreseeable future. Such increases should enhance the attractiveness of ridesharing relative to other home-to-work modes. The price of fuel has proven notoriously difficult to predict in the past, however, and considerable uncertainty surrounds its future. The dampening effect of recent price increases on consumption could have a substantial moderating influence on future prices, for example, and deregulation of domestic oil prices could provide a major stimulus to production.

Fuel prices also have an important influence on consumer decisions about automobile size and fuel economy. If sharply rising fuel prices prompt a marked shift to more efficient cars and the accompanying reduction in consumption helps to moderate future price increases, the net result could be to stabilize or even lower the fuel costs for single-occupant automobile travel. Such an outcome might make ridesharing a relatively less attractive option for home-to-work travel than it is at the present time.

Parking Standards

Traffic engineering standards and zoning requirements have had a major influence on the provision of parking capacity at workplace locations. After a number of years of prescribing minimum parking requirements, however, planners are now becoming interested in limiting parking capacity in order to reduce single-occupant automobile use. The City of Los Angeles, for example, is currently using an Urban Mass Transportation Administration (UMTA) grant to design an option to standard parking code requirements: A company may provide less parking than the code requirement if it guarantees to provide and maintain ridesharing alternatives to single-occupant commuter automobiles.

The Committee on Parking Facilities for Industrial Plants of the Institution of Transportation Engineering (ITE) is also taking a special interest in the relationship between parking and ridesharing. ITE has previously published guidelines and articles on recommended practice for parking provision, and the parking committee is currently preparing a new version of these materials. Scheduled for publication in mid-1982, these guidelines will deal with two related aspects of the relationship between parking and ridesharing: the influence of an aggressive ridesharing program on the number of parking spaces required and the design aspects of providing special reserved parking areas for ridesharing vehicles.

Vehicle Design and Availability

The design and availability of automobiles, vans, and buses over the next two decades will influence both the demand for and the supply of ridesharing services. As discussed earlier, the demand for ridesharing will be determined in part by the price and availability of alternative home-to-work modes, particularly the single-occupant automobile and conventional bus transit. The price, availability, and fuel economy of the automobile will be the most important in this regard: An attractive, inexpensive, fuel-efficient small car could dampen demand for ridesharing significantly. The price, availability, and design of conventional buses will also be important, although public policies regarding funding and fare levels will be the primary determinants of the future role of conventional transit.

Vehicle design and availability influence the supply of ridesharing through their role in the cost structure of these services. The economics of ridesharing services can be quite sensitive to the passenger capacity and operating characteristics of the vehicle; for very long commuter trips with volunteer drivers the vehicle capital and operating costs may constitute virtually all of the out-of-pocket expenses borne by the riders. This question is particularly important for vanpooling, which serves primarily the longer commuter trips and relies heavily on the passenger capacity and fuel economy of the vehicles used.

Fuel economy standards established by the National Highway Traffic Safety Administration (NHTSA) and emission standards established by the U.S. Environmental Protection Agency (EPA) are having a major impact on the design and availability of all kinds of motor vehicles. With regard to the supply of ridesharing, two particular impacts are especially relevant.

1. The trend toward smaller, more fuel-efficient cars; stimulated in part by NHTSA regulations and in part by market forces, could reduce the cost per person of lower-occupancy ridesharing modes in which two or three persons travel together in an automobile.
2. The cost increases and design changes required for 12- to 15-passenger vans could make the van less economical for ridesharing.

The second of these impacts might significantly affect the supply of ridesharing services that use vans. When in 1978 NHTSA imposed fleet average fuel efficiency standards of 16 miles/gal for vans and light trucks under 8500 lb, the manufacturers made heavier vans of more than 8500 lb to avoid the standards. The extra weight actually worsened fuel efficiency and imposed extra costs on van users. In addition, the heavy-duty equipment provided for these heavier vans added to the purchase price. Declining demand

Transit Services

The current prognosis for conventional transit ser-
for vans for purposes other than ridesharing (such as recreation, small business, and service industries) has exacerbated the van supply problem to the point where the Ford Motor Company is the only U.S. manufacturer firmly committed to staying in the van business. The last few years have seen substantial reductions in the demand for a supply of the types of vans suitable for ridesharing.

Recognizing the potential threat to the van as a ridesharing vehicle, the National Association of Vanpool Operators (NAVPO) testified against the federal standards. The Report of the National Task Force on Ridesharing published by the U.S. Department of Transportation (4) also identified federal fuel economy and emission standards as a major problem for van commuting and recommended that 12- to 15-passenger window vans more than 7000 lb be exempted from current fuel economy standards and from emission control standards "so that a supply of such vans may be ensured."

Decisions recently announced by the Reagan administration apparently will change the federal regulatory impact on automobiles and vans significantly. In addition to relaxing requirements for automatic passenger restraint systems, the administration is proposing to eliminate requirements that by 1984 all cars and light trucks meet the stricter emission standards required for high-altitude areas like Denver. A variety of other emission standards for light and heavy trucks will also be relaxed. With regard to fuel economy, the administration has decided not to require standards beyond those already set for 1985, claiming that free market forces will force manufacturers to seek high levels of fuel economy without government prompting.

While the full implications of the Reagan proposals are not yet clear, they seem likely to alleviate many of the recent concerns about the future viability of vans as commuter vehicles. Even if governmental decisions help to preserve the commuter van, however, it is not clear that demand levels will be sufficient to increase the flagging interest among manufacturers in producing these vehicles. There appears to be a real possibility that rapid growth of the numbers of small, fuel-efficient automobiles will shift many potential van users into low- or single-occupancy automobile travel.

The Regulatory Environment

While carpools and vanpools with share-the-expense arrangements and volunteer drivers have not been restricted by service regulation, subscription van and bus services employing paid drivers have been included under common carrier regulations. Over recent years several steps have been taken to relax the regulatory constraints on ridesharing. The Surface Transportation Assistance Act of 1978 removed private, nonprofit passenger commuter vanpools (up to 15 seats) from the regulatory authority of the Interstate Commerce Commission. Several state legislatures have also enacted legislation removing carpooling and vanpooling from state regulatory jurisdiction, although many other states still retain such regulation for vans.

While considerable progress has been made in relaxing regulatory restrictions on ridesharing services that use automobiles and vans, little has changed with regard to restrictions on subscription bus services. State and municipal regulations prohibiting competition to conventional transit services have restricted subscription bus services to trips not served by the transit route structure. The current financial constraints on capacity expansion for conventional transit strengthen the case for relaxing restrictions on supplementary services like subscription buses. If such changes are made over the next decade, the supply of ridesharing services employing vehicles of more than 15-passenger capacity might increase substantially.

Level of Employer Interest

The growth in the number of employers initiating ridesharing programs has been very encouraging over the last few years. DOT (4) reported recently that "some 250 private employers have initiated their own programs and 26 states and regional ridesharing associations are helping acquire vehicles for vanpool programs." This report also noted that "most successful programs exist where employers commit staff and promotional material for this purpose on an ongoing basis."

The continuation and expansion of employer interest over the next decade would appear to be essential to the continued growth of ridesharing. Whether the concerns that have stimulated employer interest over the last five years will continue, grow, or decline in importance is difficult to predict. It certainly should not be assumed that employer interest will automatically continue on its present growth path. More thought needs to be given to the likely influence of employer involvement on the future supply of ridesharing and to how that involvement might be encouraged and reinforced on an ongoing basis.

SECONDARY AND LONGER-RUN IMPACTS OF RIDESHARING

Prearranged ridesharing options—carpools, commuter vans, and subscription buses—can be highly effective short-run ways to reduce automobile VMT during work commute hours. As low-occupancy automobile users switch to higher-occupancy vehicles, the adverse effects of automobile use are reduced. It cannot always be assumed, however, that an increase in the level of commuter ridesharing will significantly reduce overall VMT. If, for example, new commuter van users leave vehicles at home for use by other family members, additional VMT could be generated that would partly offset the commuter savings.

While all ridesharing programs seek to reduce overall VMT, these programs often have secondary impacts that may have some positive and negative effects on the overall benefits generated by the programs. By making more space available during the day for use by other family members, a program may generate positive impacts for those making extra automobile trips and negative impacts on total VMT savings. In the longer term the ridesharing program may also reduce automobile ownership and thereby effect further reductions in total VMT. The program could also encourage more families to move to more-distant neighborhoods, thereby lengthening commute and nonwork trip lengths and contributing to lower-density development.

Ridesharing programs could have positive impacts on commercial and industrial development by reducing the parking requirements and expanding the potential catchment area for workers. In some high-density commercial areas, an effective ridesharing program could permit significant substitution of office space for parking space and thus increase commercial values.

The final potential impact of privately operated ridesharing modes such as carpools and vans concerns the effect on conventional transit. If these ridesharing modes divert enough transit riders to reduce peak-period transit costs, the public may benefit. If, however, the transit revenue is just lost without any offsetting savings in transit capacity,
there is a net loss as far as public benefits are concerned. Unfortunately, little empirical information exists to indicate how significant these types of secondary and longer-run impacts could be. In this section we review the information currently available on these impacts and comment on the implications for quantifying ridesharing benefits. In the next section we discuss the research needed to increase understanding of the overall impacts of ridesharing.

**Nonwork Automobile Use**

Shifting commuter drivers to ridesharing modes can make more automobiles available to other household members. The resulting additional nonwork VMT partly offsets the commuter VMT savings. One source of data on the additional nonwork VMT is surveys of carpoolers and vanpoolers in programs throughout the United States. Based on user surveys in Chicago, Pittsburgh, and Sacramento, about 15 percent of ridesharing users reported an average additional household use of between 5 and 6.4 miles/week; an offset to the work trip VMT savings of from 5 to 10 percent (5). About 12 percent of the carpoolers in a San Francisco ridesharing program reported an average additional household use of 7.2 miles/week, roughly 4 percent of the commuter VMT savings (6). A survey of vanpoolers in Los Angeles found that 8 percent reported additional automobile use of about 4 miles/day, offsetting the work trip VMT savings by about 2 percent (7). Vanpooler surveys in Houston and Dallas found that the average automobile left at home traveled about 6 miles/day, offsetting the commuter VMT savings by about 11 percent (8).

Another approach to determining how much nonwork VMT offsets the work VMT reductions involves the use of home-interview data. Based on data from Buffalo in 1962 and 1973 and Rochester in 1974, those households whose primary work trips were all by vehicle driver were compared with those households whose primary work trips were not by vehicle driver (9). It was assumed that the difference in these households' nonwork VMT could be attributed to the car left at home during the day. The additional nonwork VMT derived from this approach amounted to about 6 miles/day for Buffalo and more than 4 miles/day in Rochester. Since the potential commuter VMT saving was about 10 miles/day per household in both areas, the additional nonwork travel represents from 40 to 60 percent of the commuter VMT savings.

Travel demand models have also been used to estimate additional nonwork VMT due to the car left at home. An application of disaggregate work and nonwork travel demand models to various carpool policies for Washington, D.C., found that the nonwork travel offset about one-third of potential work trip savings (10).

Different work trip lengths, which determine the initial commuter VMT savings, help explain some of the differences noted above. For example, if the additional nonwork travel associated with a vanpooler commuting 40 miles/day is 4 miles, then the commuter VMT savings is offset by 10 percent. If the additional nonwork travel for commuters with an 10-mile daily commute is 4 miles/day, then the commuter VMT savings is offset 40 percent. Other explanations for the differences include the difficulties of estimating how much other family members use the car, the different travel conditions in various urban areas, and the time when the data were collected. One can hypothesize that gasoline availability and price have had a large effect on the amount of nonwork travel. Since these factors have been changing over recent years, nonwork VMT estimates vary greatly depending on when they were made.

**Impacts on Family Automobile Ownership and Residential Location**

The availability of long-distance ridesharing modes such as vanpools and subscription buses may influence people to locate their homes in the areas served and, over time, may have a significant impact on urban form. High-quality ridesharing services may also have a direct impact on automobile ownership by rendering a home-to-work car unnecessary. A survey of commuter bus riders living in the new town of Reston, Virginia, about 40 percent indicated that they would not have chosen to reside in Reston (which is more than 22 miles from Washington) had the bus service not been available (11). This survey was taken about 5 years after the service started. During the first year of a ridesharing program, it is reasonable to assume that there is little impact on residential choice because potential users cannot be sure that the program will be permanent. As each year goes by, however, it is more likely that some of the residents of the areas served, both old and new, will be influenced to stay in the area by the ridesharing program. Although residual choice represents a complex decision based on many nontransportation factors, as the cost of automobile ownership and use increases some ridesharing options may have an important influence.

A comparison of average automobile ownership for ridesharing workers with those of drive-alone commuters over a 2.5-year period in Minneapolis found no clear evidence that carpoolers or vanpoolers were significantly more likely to reduce their automobile ownership than others (12). A survey of vanpoolers in Massachusetts indicated that 8 percent intended to sell a vehicle and one-third said that the vanpooling option would affect their decision to buy another vehicle (13). Travel demand models have provided estimates that automobile ownership will decline less than 2 percent due to carpooling incentives (10).

It appears that the net impacts of ridesharing on residential development patterns and automobile ownership are very difficult to quantify at present. We believe that the effects may be significant and that this topic represents a major research area.

**Impacts on Commercial Land Use**

Perhaps the best example of the impact of ride-sharing program on commercial property development occurred at the TVA's headquarters in Knoxville (14). When the TVA decided to construct new office facilities and eliminate about 1300 surface parking spaces for its employees, it implemented a large-scale carpool, express bus, and vanpool program that provided acceptable transportation to its workers at a lower cost than providing additional parking. A large-scale version of this approach is being developed for downtown Los Angeles (15). One element of the five-year parking management program proposes to allow developers to build new office facilities with fewer parking spaces if the business tenants will guarantee to provide ridesharing options (or park-and-ride lots) for their employees. The city's objective is to stimulate new commercial development and rehabilitation of older buildings in the central business district. The program will include appropriately provided options as well as conventional transit. Since the combined land and construction costs of a parking space can range as high as $20,000, a reduction of even a few spaces could free considerable funding and space for
more profitable uses. Assuming these proposals go into effect, there will be considerable interest in whether builders and lenders believe offices with less parking can be sold and in how employees respond to the ridesharing programs. Changing parking codes to encourage ridesharing in expanding urban areas such as Los Angeles could have significant long-term impacts on regional development patterns and commuter automobile use.

**Impact on Use of Transit Services**

Experience to date with ridesharing programs indicates a wide range of diversion from transit services. In Los Angeles, more than 30 percent of the vanpoolers previously used local, express, or subscription buses and about 10 percent of the carpoolers previously rode transit (7,16). In Massachusetts, 10 percent of the vanpoolers came from transit (13). In Minneapolis, from 4 to 6 percent of the carpoolers and 8 percent of the vanpoolers formerly rode buses (12). About half of the participants in the Golden Gate Bridge commuter van program previously used transit (17). The amount of diversion from transit in each case reflects the specific user characteristics and the quality of service provided by the ridesharing and transit services. While ridesharing modes may be the only viable options for serving lower-density work sites, in higher-density areas transit and ridesharing compete for riders.

The basic challenge is to establish the optimal relationship between the various high-occupancy modes. If ridesharing programs operate on a large enough scale to permit reductions in transit capacity [as, for example, on the Shirley Highway in Washington, D.C. (18)], then they can make a major contribution to the overall cost-effectiveness of the public transportation system. Some small-scale programs divert transit riders without reducing transit costs, however. In Seattle, reduced parking rates for carpools created new carpoolers, but 40 percent came from the transit system (19). In these situations two kinds of negative impacts occur: The transit revenue losses increase the costs of the programs without any offsetting savings from reduced transit capacity and VMT reductions are much more limited than they would have been if more of the carpoolers had come from private automobiles.

**RESEARCH CHALLENGES**

The previous sections have outlined a number of special considerations regarding ridesharing over the medium to long run. Several questions were raised with respect to the future environment for ridesharing and the longer-run and secondary impacts of ridesharing programs. In this section we discuss some of the challenges we believe are presented to the research community by these questions.

**Future Environment for Ridesharing**

Studies of demographic and migrational trends in the United States have suggested that some substantial changes are likely to occur in the number and structure of households, the participation of women in the work force, the location of new development within metropolitan areas, and the relative growth rates of different metropolitan and rural areas. These trends have important implications for the future demand for ridesharing services and should be incorporated into current planning and policymaking activities. The full extent and implications of these changes require greater attention from researchers.

Fuel prices and automobile fuel economy will have significant impacts on the demand for ridesharing. Though fuel prices in particular may be difficult to predict, their role in the future of ridesharing must be kept in mind. Continuing research on the fuel price and vehicle fuel economy question is needed.

Parking standards also play a role in shaping ridesharing demand. There are some initial indications of changes in these standards that should favor ridesharing over the single-occupant automobile. Researchers should play an active role in helping to formulate new parking standards and in evaluating their impact on ridesharing demand.

The future role of conventional transit in urban transportation is currently the subject of considerable policy debate. The research community should help to inform this debate by pointing out the potential role for ridesharing in relieving the pressures on rush-hour transit services. This role has not yet been adequately defined, although demonstration projects in cities like Norfolk, Knoxville, and San Francisco have shed some new light on the possibilities.

The controversy over the questions of vehicle design and availability demonstrates, we believe, the need for thorough cost-benefit analyses of proposed government regulations in this area. In the past, well-meaning regulations have created anomalous situations and stimulated some counterproductive behavior on the part of both manufacturers and consumers. The proposals of the Reagan administration for relaxation of many of these regulations provide an opportunity for researchers to take another close look at the alternatives available.

Continuing attention is needed in the regulatory area, particularly with regard to subscription services employing paid drivers and vehicles of more than 15-passenger capacity. While considerable progress has been made in relaxing regulatory restrictions on vanpools, little has been achieved for services by using larger vehicles. Growing financial pressures on conventional transit make increased attention to these regulations all the more necessary.

The level of employer interest is sure to be an important element in the future of ridesharing. Research attention is needed to identify the issues likely to be of primary concern to employers over the medium to long run and to explore the ways in which ridesharing can best address those issues.

**Longer-Run and Secondary Impacts of Ridesharing**

During the 1970s, many ridesharing programs were initiated to save gasoline, improve air quality, reduce congestion, and achieve other public benefits resulting from reduced automobile use. Experience with these programs has shown that, while ridesharing services can be cost-effective ways to reduce commuter VMT, secondary effects such as the use of the car during the day or diversion from transit can increase costs and partly offset commuter VMT savings. If these secondary impacts are not properly taken into account, objective assessments of the benefits and costs of ridesharing programs cannot be made. We also do not know the extent to which longer-term impacts on automobile ownership and residential location will reduce the effectiveness of ridesharing programs with regard to VMT reduction. These concerns suggest several possible directions for research to increase understanding of the overall impacts of ridesharing.

One possible research approach involves more cross-sectional analyses of the ridesharing programs that have existed for several years. By surveying
The research challenge is to devise efficient ways to determine how important specific ridesharing programs will be to families selecting a residence or buying and using automobiles. While it will not be possible to remove all the uncertainty about the role of ridesharing in these types of decisions, carefully designed studies should be able to indicate the general trends and suggest how they might be included in assessments of the various ways to reduce VMT.

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REFERENCES

"We are all richer than we think we are" (Michele de Montaigne) and "The whole problem of life is to understand one another" (Woodrow Wilson). It is with some fear of overstating that we apply these lofty personal feelings to transportation research, but it is nevertheless true of our condition. Whether it be transportation in general or ridesharing in particular, there is a vast hemisphere of skill and knowledge awaiting our exploration and exploitation. We have only to find the will and establish the alliances and agreements with which to proceed.

It is to address this vital step that we will only skirt the areas of marketing and hope to offer to those in program planning, operation, and marketing a resource that can multiply the effectiveness and productivity of transportation and of ridesharing.

We will try to spare you a tedious review of where ridesharing has been. We have not done badly for a mode that, while long known and practiced, has been little studied and less understood and has the possible distinction of being the only essentially unsubsidized sector of transportation and perhaps of our society.

With some assistance from the explosion in the price of fuel and the overall economic inflation, ridesharing has become a serious factor in transportation. However, while the fuel crisis that contributed directly and indirectly to transportation costs was perhaps a necessary part of the process of change, it was in most cases not sufficient. Intensive research over the past six years has revealed that the decision to rideshare has been a product of such factors as the congestion and hassle of driving alone, parking problems, information on the nature of ridesharing, as well as the facilitation of access to ridesharing. This last item highlights the tremendous gains made in overcoming the barriers to ridesharing. The advent of vanpooling and buspooling has strengthened the options offered by ridesharing as have the several new information, marketing, brokerage, and matching techniques.

Despite the evident progress, we are here assembled. Research, especially population research in ridesharing, has a more checkered career. It has been little studied and less understood and has the possible distinction of being the only essentially unsubsidized sector of transportation and perhaps of our society.

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Despite the evident progress, we are here assembled. Research, especially population research in ridesharing, has a more checkered career. It has gone through stages of ad hoc pronouncements to dust-bowl empiricism. The transfer of technology from other research areas ranges from some crude applications of demography, survey methods, marketing, and systems study to more sensitive work in community organization, social and motivational psychology, and marketing.

There is no special virtue to old techniques just because they exist or because the old skill must be marketed. If they do not provide the required solutions, it is the practitioner's responsibility to isolate the real questions and devise or adapt methodology and solutions.

The behavioral and social sciences have misapplied a variety of borrowed methods to ridesharing. These range from the aforementioned sterile type of empiricism, in which we lost the forest for the trees, to some introspective methods that yield little but a hunch and a guess. Careful examination of some of the behavioral approaches reveals an underlying deviation from the medical model for diagnosis and treatment. Intrapsychic studies and motivations, while useful as a part of the configuration, require closer linkage to the realities of economics, resources, and systems.

We have also obtained conclusions that are so macro or general that they lose applicability to any specific group or situation—losing the trees for the forest. They constitute a kind of hollow generalization rather than a field theory.

Perhaps the holiest of grails has been the search for the perfect model, a "10" among computer formulations. Unfortunately, as with the human prototype, it has been difficult to obtain all of the required elements and even less possible to bring them together into a meaningful system. Reducing the components to digital equivalents while preserving the whole is even more difficult.

While his remarks do not apply to all modeling, Ashby Bloden reminds us that "there's an obvious fallacy in that approach to forecasting. It is thus: occasionally something happens that changes those fundamental relationships, then the forecast goes sailing off into the wild blue yonder.... The trouble was compounded by the fact that most econometricians are mathematical types who are fascinated by algebraic models but aren't very interested in what real people actually do out there in the real world. So it takes them a long time to wake up to fundamental changes in people's habits" (Forbes, April 27, 1981, p. 184).

How do we reduce a creature with a predisposition for stubbornness, habit, counterproductive behavior, contrariness, prejudice, etc., to a logical, orderly, predictable, and, above all, reliable system? It is not easy to quote the headline in that same Forbes article, "People Aren't As Dumb As the Economists Seem To Think They Are. That's Why Econometric Models Don't Always Work." The intelligence and adaptability of man along with his vices listed above make modeling a formidable objective.

To proceed with the tale of woe, with the exception of some good research efforts resulting from the determined probing and juggling of Transportation Research Board committees and study sections, the rag-tag progress of current research continues.

It is frequently redundant. It grasps at marginal aspects of the problem. It tries to derive new insights from old data as though the contextual conditions were still valid. Scope and generalizability are limited. Questionable samples are used. Research communications lag. We have neither dedicated ridesharing journals nor an institution dedicated to the assembly and dissemination of methodology or information. Meetings focused on research are few, although increases are expected.

In addition, we have little recruitment and training capability to produce the kind of researchers we need. We are heavy on quantification, but it is possible that we are quantifying before learning the critical variables—let alone their dynamics. Theory development, on the very rare occasion that it takes place, is not too often separated from practice. These are, in reality, two sides of the same coin. It is difficult to maintain consistent practice and training in the absence of
theory. Theory without formative evaluation obtained only from practice, is ineffective and not valued or valuable. We need theory to guide the systematic exploration of the various kinds of transportation behavior, in addition to ridesharing, leading to hypotheses for research and formulations for practice. That would appear to be where we are now. Research is emerging in transportation (and ridesharing) decision making and in the closely related population study and marketing areas. We are increasingly sensitive to user needs and characteristics and we are mulling about the entrance to the social, economic, and psychological processes that govern them.

WHAT DO WE NEED FROM RESEARCH?

We need information on which to base policy, to plan programs that will meet the transportation needs generally and the development of ridesharing specifically. Major obstacles have included the following:

1. Several disciplines overlap in providing the needed information;
2. They do not have common or even shared orientations or bases; and
3. Very little has been done to bring them together or even to establish shared goals for the scientist and the practitioner to pursue in parallel or in common.

The disciplines include transportation-engineering and management, economics, psychology, demography, sociology, and marketing. The history of behavioral research in transportation has been marked by an undefinable mixture of efforts to predict demand, affect demand behavior, determine cost/benefit, etc. In an effort to transfer existing techniques to the new requirements, there has been some success but quite a bit of wheel spinning, confusion, or poor communication. Each discipline claimed the virtue of its methods, some of which were useful. Others were not applicable to transportation; necessary but not sufficient; or not able to communicate with the many mills that must grind transportation information (e.g., planning, budget, operations, training, marketing, and evaluation).

There has been no uniform language or body of information. While the situation was not quite a Tower of Babel, we have had not the basis for obtaining or using information effectively.

Instead of writing a textbook on research methodology here, it would seem more constructive and discreet to start defining the common goal areas subject to negotiation.

We need a process for studying the psychological, social, economic, and managerial aspects of the movement of people, individually and in groups, through space, over time, with origins and destinations, within the context of a variety of options and constraints. As a further qualification, it must be recalled that people are creatures of whim, fancy, and habit with varying concepts of reality, style, status, etc.

It is indeed a difficult task, but that is not a reason to shirk the task. The rewards are also great.

The objective would then be a new discipline that takes what it needs from the old. Beginning with that, any index of ridesharing, it would generalize to other areas of transportation.

For the moment, let us call it research in transportation behavior (RTB). It should deal with the relevant aspects of the disciplines listed above and the full gamut of factors that influence human behavior in the transportation system.

Within this format of a new discipline, a number of problem modalities could be addressed. The implications of economic, psychological, social, and other factors should be considered for each. Some examples follow.

1. Improved use of demography including baseline data and the sophisticated study of the meaning and application of demographic change for transportation and ridesharing;
2. The understanding of factors that influence human transportation decision making including (a) changes in available options—economic, social, logistic; (b) sociological changes affecting economic demand, group process, and group pressure; (c) changes in human perception—individual and group perceptions of cost, comfort, speed, time, distance, etc.; and (d) psychoeconomic factors—fear of harm or loss of property, greed, establishment of demand, need for privacy or affiliation, relative economic mobility, commitment, etc.; and
3. Implications of population shift for old and new areas, e.g., effect of known population segments entering a new area (movement of Eastern or Midwestern professional and white-collar workers to Houston and Denver including the effects on Houston and on the sources of the population).

These may be achieved through macro and micro studies of behavior.

Macro studies of behavior involve larger numbers of individuals or political units. Social forces and social processes operating in the larger area are somewhat more predictable as a rule. Learning the dynamics requires extensive study but leads to the capability for planning for the larger divisions. Information is based on the study of the interaction of macroeconomics of the area—for example, (a) changes in work patterns, locations, and hours; (b) change in taxes; (c) change in the average income level of the larger group; (d) change in group cohesiveness; and (e) dynamics of changes in effective demand (cumulative). These kinds of data can be integrated with the social process described above and with the political processes and changes as they affect possible policy options.

In developing the methodology for macro studies, other related areas such as cross-cultural research should be examined for methodology extending the limits of RTB beyond those set by survey technology, group methods, and other methods in current use.

Macro studies are useful methods for approaching large populations or major population segments. However, they are usually too gross to permit the development of programs for specific population segments or to provide understanding of the opportunities and problems encountered in working with smaller units.

Micro studies are frequently required when programs are to be directed to more specific target audiences, either for geographical reasons or in an effort to meet the needs of a particular mongeographically contiguous population segment. A necessary step involves the disaggregation of the large population into smaller segments. Subsequent micro study involves both transportation-relevant information and data descriptive of the population characteristics—their occupational status, economic conditions, shopping habits, group cohesiveness, attitudes toward other groups, self-perception, goals and aspirations, readiness to
accept innovation, reference groups, and other motivational information. The integration of these factors into a meaningful understanding of the subgroups is essential to program development, ridesharing matching procedures, and effective marketing (the development of incentives and disincentives).

**CONTEXTUAL FACTORS**

Effective research with large or small population groups requires careful attention to contextual factors that may affect the course of events and the quality of research. Some are enduring—e.g., inflation, fuel costs, population density, etc. Others are more transitory and may only be feared (they need never occur to affect events)—e.g., strikes, intergroup tension, and inclement weather. These factors have psychological, economic, and political elements. A strike must be considered in all of its ramifications before policy decisions are made.

A steady growth of population density will have different sequelae for intergroup tension in the face of depression or prosperity, rising supply, or price increases. A single incident may trigger long-hidden feelings.

Sensitivity to the presence, dynamics, and effects of such factors is necessary to both planning and subsequent adaptation of programs. The role of ridesharing in transit strikes is well known. Two methods are recommended: (a) forward-looking attention to public affairs and a finger on the pulse of the community and (b) the use of formative evaluation that takes note of perturbations associated with the events, isolates the relationship, and recommends the necessary adjustments.

A sizable list of specific study areas affecting ridesharing is suggested. Each has psychological, social, and economic aspects and cannot be fully understood without interdisciplinary (or pan-disciplinary) study. These topics overlap somewhat and indeed they are interrelated:

1. Acceptance of innovation—a critical area for a mode that faces the barriers of old habit, tradition, and personal convenience and is seldom accepted unless either relative benefit over the older way is demonstrated or the old options are removed or made more difficult;
2. Traveler decision making, motivational, economic, etc.;
3. Transportation management decision making;
4. Social processes and factors in transportation;
5. Factors affecting behavior during travel;
6. Factors affecting satisfaction;
7. Factors affecting mode choices;
8. Factors affecting choice of social conditions for travel;
9. Perception of the several modes by different populations (this may include perceptions of distance traveled, time elapsed, security, level of personal control over travel, density, privacy, convenience, etc.);
10. Critical issues in matching;
11. How groups are formed, how they function, development of roles in the groups, leadership, the role of the driver, coordinator, etc.;
12. Factors affecting the survival of ridesharing groups—techniques for group maintenance;
13. Communication with potential and current riders;
14. Development of participation and commitment in a program;
15. Implications for ridesharing of commute length, commute time, vehicle type, mode type, seasonal or weather-related factors, trip purpose, traffic congestion, and time constraints; and
16. Meaning of commute to different population segments, e.g., time for thinking, time for recreation, and time for privacy or sociability.

These and other uses of the commute have proved to be significant factors in the acceptance of a given mode or travel condition. Availability of such information can assist in the design of more suitable modes or more effective matching, e.g., silent carpools or sociable vanpools.

The several topics listed above fall into at least two major research groupings that must be addressed as a whole, as well as in part. First is the development of the delivery system for ridesharing. This includes the entire range of activities from the initiation of the program by a public or private agent to the population studies employed as the basis for planning. It includes agencies, the media campaign, and the less formal methods of promoting and marketing the program. The financing of the program and its vehicles is also involved. It includes the system of work-end or home-end coordinators that may be employed to market the program and match the goodwill to the commuter. Further along the delivery system, there are problems of group and program maintenance and evaluation and correction of the overall process.

The delivery system is a complex mechanism that will be somewhat different for each setting and yet have the basic thrust of implementing the program and delivering the product—ridesharing.

Another major grouping of research issues, which overlaps with marketing, includes the issues relating to the public and political perception of the program. Many factors must be included to achieve a good understanding of how the program is seen and whether it is accepted.

Potential cooperation and competition with other modes benefit the community, as well as individuals, employers, land use agencies, and media presentations on ridesharing. These and related issues determine how ridesharing is seen by the elements in the community, whether it is accepted, and what policy is required to achieve acceptance and implementation.

These are but a few of the researchable issues associated with the study of populations for ridesharing and transportation programs. As a body of knowledge develops, it is likely to create as many problems as it solves but these should lead to greater skill and better programs.

**SPECIAL RESEARCH AREAS**

A number of typical areas may merit attention by ridesharing researchers. Among these are (a) intercity travel, where cost-effective; (b) vacation and leisure travel; and (c) technological impacts. The last might include design of vehicles for greater comfort, privacy, access, etc., which may facilitate ridesharing; communications technology—a range of telecommunications options already exists ranging from shared radio telephone to warning radio tones relayed to a receiver in each home as the ridesharing vehicle approaches; and express lanes may be only a start in the development of improved ridesharing highway incentives.

**RESEARCH OBJECTIVES**

In its effort to meet the informational and policy needs of ridesharing and of transportation, we have noted the importance of theory development; in particular a theory that bridges the multiple disciplines that deal with ridesharing behavior. The
special quality of the theory we seek is its ability to bridge the disciplines and is characteristic of human behavior. This principle explains some aspects of behavior overlaps extensively with psychological motivation theory and sociological principles explaining the group processes that affect human work or transportation activity.

We have also suggested that this is an accretive process in which observations lead to hypotheses, hypotheses to principles, and, finally, a comprehensive body of knowledge and method is collected that permit the development of theoretical systems. These, in turn, provide the framework for a systematic study of ridesharing and for communication between scientists and practitioners.

These principles are of varying character. Some are quite universal in character. They remain valid over time and differing populations. For example, the concept of the goal gradient is true for most people. It states that the closer an individual is to the achievement of an objective, the more powerful the attraction of that objective for him. This is a universal human characteristic. It explains economic and social as well as psychological phenomena. Indeed, if we examine the formulation carefully, it also describes gravitational dynamics in the universe.

The interrupted task effect is another powerful tool. Where a task is begun and then interrupted, it continues to appear to exert a disturbing influence on any intervening tasks until it is itself completed. This principle explains some aspects of work behavior and probably weighs heavily in the general disapproval of split mode transportation systems.

Thus we do have universals that bridge disciplines and are characteristic of human behavior under any circumstances. The development of a network of universals should be one of our prime objectives.

There are, however, other less durable but equally valuable principles—those that change over time or conditions of application. The impact of change in economic cost is a useful example. This effect varies according to many variables, e.g., the value of the unit of cost (money) may be going down steadily (inflation). This reduces the impact of a given price change. Age differences, the availability of money, who earned the money, etc., are only a few of the factors affecting perceived cost that is so important to marketing, economics, psychology, and politics.

Closely related and useful in understanding the effect of changes in economic cost is the just noticeable difference. This venerable psychological principle explains why a gradual increase in the cost of an item (e.g., fuel) over a six-month period in small steps (e.g., one-half cent/week) is less disturbing than a sudden but equivalent increase of 6.5 cents/gal. The 6.5 cents is more than a just noticeable difference, one-half cent/week is less.

Other rules of behavior are true for limited geographic areas, socioeconomic groups, or cultures. Transportation innovation is more evident in a highly mobile and fluid situation than in a stable one. It is more easily accomplished in upwardly mobile economic or social settings than in relatively downward mobile economic or social situations. Thus, responses to a question about trying a new mode differ for different population samples.

Until the actual economic squeeze is felt, those who are losing ground in the economic race may actually show more resistance to the acceptance of ridesharing than their more fortunate fellow citizens. When the punch is felt, a response reversal can be expected—although it may be longer in coming for some populations for other psychological and sociological reasons.

We have demonstrated several levels of certainty, and in the course of doing so we noted the heavy interdependence of the social and behavioral sciences in this task of explaining transportation behavior. The successful bridging of the disciplines will lend a kind of hybrid vigor to the new discipline, a vigor derived from its ability to deal with varying climates and conditions and with the surprising adaptability and pervasiveness of man.

A comment on Heisenberg's Principle of Uncertainty should be offered here. It applies to behavior as well as to subatomic particles. When information or prediction about behavior is made available to an individual or group, it is likely to alter or even reverse the behavior. So much for linear and long-range projections. The U.S. Census Bureau report describing the decline in the use of public transportation for commuting from 1970-1977, despite large increases in fuel costs and greater availability of public transportation, carries a clear message.

An even more dramatic statement of the predictable unpredictability of man is the apparent conflict between the "gambler's fallacy" effect and running scared in politics. Does the candidate want to lead or lag in the polls? Each may be useful. If he is not far enough ahead to make it look like a sure victory, he is better off being the underdog to obtain the added effort of his supporters and the sympathy of the undecided voter. Prediction is uncertain.

**SIGNIFICANT NEXT STEPS**

We have touched on some of the needs and caveats of research. They should not be understated. However, for this audience, it may be even more important to cite some of the significant next steps.

Manpower recruitment is a critical need. There are not enough well-trained transportation researchers; there are fewer in ridesharing. We must reach the gatekeepers—e.g., the professors of the several disciplines and their students. Writing for economic, psychology, and other journals will help. Developing and teaching courses that demonstrate the applicability of the discipline to transportation provides even more intimate contact and career modeling potential.

Is there a prescription for transportation behavior researchers? There is only the formula for good scientists—open mindedness, problem solving, a heuristic approach, and, where possible, cross-disciplinary experience as well as real interest in the subject.

What levels of research do we need? Clearly there is a need for full-time dedicated people. Some will have to be borrowed from the old disciplines. Time, it is hoped, will change this condition.

There is also a need for research training and orientation for those who will not spend full time in research as well as for transportation managerial and program people who will cooperate in research and evaluation. Even more important is their learning how to make use of research: to criticize it and to direct it to better serve their needs. These are the two sides of the coin we spoke of earlier. May we reach each tool—where do they come from? Researchers, being the "ornery bunch" they are, will do their own creating. A number of "creations" are needed. Terminology can never be regi-
The promotion of ridesharing emerged in the early 1970s out of a crisis that for the first time made American drivers stop and take an urgent look at an old and comfortable habit—the consumption of gasoline. What was before that time no more than a taken-for-granted utility became a collapsing bridge between the driver and his or her destination.

Ridesharing was certainly nothing new, except to the extent that the more ridesharing that occurred, the more the energy shortage would be mitigated. With the recognition that there was no obvious profit to be made in promoting ridesharing, it became the responsibility of the public sector. In the hands of the public sector, ridesharing presented mixed blessings. Because it was neither capital nor particularly labor-intensive, the cost seemed extremely small when compared with potential benefits. What the public sector encountered in trying to motivate increased ridesharing were such familiar functions as administration and operation of basic services, i.e., carpool matching. What remained was promotion or marketing—a skill in which the public sector was not as adept and continues to be one of the major challenges among rideshare projects—to change travel behavior through more-effective marketing techniques.

This paper discusses the Portland area (Tri-Met) rideshare project's experience—where we started, where we are, and where we think we are going. It is also intended to evoke the opinions, comments, and experiences of other rideshare projects in order that the Tri-Met rideshare project can change and refine its own efforts.

THE EARLY YEARS

The Oil Embargo as Catalyst

The nationwide fuel shortages caused by the oil embargo of 1973-1974 triggered the first organized efforts to develop and promote carpool programs. The Oregon Department of Transportation (ODOT) was the first recipient in the country of emergency assistance from the Federal Highway Administration (FHWA) within the U.S. Department of Transportation. With $225,000 in federal aid, ODOT organized a carpool program, targeting the Portland metropolitan area. Little was known about the size and characteristics of the potential market, nor was there any prior experience in devising cost-effective methods of tapping the potential market. Nevertheless, the severe fuel shortage situation had generated a ready market for alternatives to solo driving. At the peak of the embargo crisis, four telephone operators worked double shifts to field the barrage of calls to the carpool program.

The Tri-County Metropolitan Transportation District of Oregon, known as Tri-Met, took over the carpool program from ODOT in 1975. Tri-Met, the largest transit district in Oregon, serves the Portland-Vancouver metropolitan area. Initial marketing strategies centered around Tri-Met's carpool matching service for two reasons. First, it was believed that drivers and passengers interested in carpooling needed such a service in order to set up workable carpools; and, second, Tri-Met needed to build up a solid data base of carpoolers in order to research some of the most basic unanswered questions regarding carpoolers; i.e., How did carpoolers differ from noncarpoolers? How did carpoolers learn of the Tri-Met matching service? What factors influenced their decisions to carpool? And were the carpool program and the transit system in competition for the same target markets?

Tri-Met's promotion of the carpool matching service had two components: (a) To reach the general public, public service announcements (PSAs) were obtained at no cost and aired by the electronic media; and (b) to reach commuters, large employers in the area were contacted and informed about Tri-Met's matching service. Both approaches were geared toward increasing the volume of carpoolers who used the matching service.

Initial Research Techniques

Before research into the carpool market could proceed, Tri-Met was confronted with a key methodologi-
cal decision: how to define carpool. The treatment of this issue was not simply a matter for statisticians to ponder; as a publicly funded agency, Tri-Met was under pressure to justify the level of effort devoted to ridesharing activities by producing statistics regarding the extent of ridesharing and level of participation in Tri-Met's program within the Portland metropolitan area. After deliberating on the various possible definitions of a carpool, Tri-Met chose to adopt one of the strictest definitions of a carpool—that is, three or more people riding together to work or school four or more days a week. It should be noted that there were and still are wide variances in the carpool definitions employed by programs across the country; indeed, many programs define a carpool as two or more persons and fail to address the issue of frequency of riding. Although Tri-Met recognized that the stricter definition would reduce the reported size of the carpool market, it was also felt that use of a stricter definition would lessen public skepticism regarding the program's achievements. For purposes of comparison with other programs, data regarding two-person commuter groups (traveling to work or school four or more days a week) would also be collected.

A second decision regarding research methodology concerned the populations to be examined. At the time, many rideshare programs' research and evaluation activities relied exclusively on their own data files. While information regarding users' demographic characteristics, travel characteristics, reasons for carpooling, and so forth was clearly essential to an evaluation of the program, Tri-Met also designed and conducted a series of general public telephone surveys to determine their awareness of and receptivity to carpooling and their participation in carpools not sponsored by Tri-Met. The surveys were also intended to identify services and/or programs that might attract noncarpoolers to carpools.

Post-Crisis Strategies

The transfer of the carpool program from ODOT to Tri-Met had coincided with the lifting of the oil embargo and a resulting public perception that the energy crisis was over. In a relatively short time, the heavy carpool demand brought on by the fuel shortages was markedly reduced. In response to the changed external circumstances, the theme of Tri-Met's carpool marketing campaign was altered: Whereas promotion of the carpool matching service had been sufficient to attract demand during the fuel crisis, a broader-based promotional strategy appeared necessary in the absence of a strong external public incentive to rideshare. Thus, Tri-Met adopted a lowered profile: the new PSAs placed more emphasis on the generic concept of ridesharing—i.e., the benefits to the user in terms of cost savings and convenience—and less emphasis on Tri-Met's role in providing services to carpoolers.

In early 1976, Tri-Met received a supplementary grant of $350,000 from FHWA to start a vanpool loan program, whereby local businesses would receive interest-free loans to finance the purchase of vans for use by their employees. This plan, while attractive on paper, was based on three unfounded assumptions: (a) that local businesses would be familiar with the concept of vanpooling, (b) that they would be interested in operating vanpool programs, and (c) that they would require capital in order to do so. In fact, most businesses Tri-Met approached had no knowledge of the vanpool concept and were unenthusiastic about taking on any responsibility for their employees' transportation to work; those that were interested needed information and technical assistance, not interest-free loans.

Tri-Met therefore requested that FHWA permit the vanpool loan funds to be used for increased Tri-Met staff and informational materials; this request was granted, thereby enabling Tri-Met to offer increased support services to businesses with an interest in sponsoring vanpool programs.

THE PRESENT

Current Ridesharing Research

An estimated 625,000 people commute daily within the Portland metropolitan area. Tri-Met's research regarding the commuter market in Portland and environs has yielded the following general findings:

1. Who carpools? Just about 8 percent of commuters to work or school ride in carpools of three or more persons; another 9 percent ride in groups of two. In addition, 36 percent are male; 44 percent have annual incomes of more than $20,000; 50 percent live in two-commuter households; and 43 percent joined their carpools within the last year.

2. What are their travel characteristics? Most commute to work; only 7 percent commute to school. Peak-hour commuters comprise 78 percent of the total grouped.

3. How do they differ from noncarpoolers? Carpoolers are less likely than noncarpoolers to have changed their places of residence within the past year. In addition, they are more likely than their nonpooling counterparts to have had a recent change in automobile availability. With regard to attitudes toward carpooling, carpoolers feel more positive than noncarpoolers about traveling on a fixed time schedule, relying on others to be on time and to drive, and having others depend on them to be on time.

4. How do commuters find out about carpooling? Most carpoolers learn about carpools from their coworkers. Coworkers are also cited as the major influence on carpoolers in their decisions to join a carpool.

5. What were carpoolers' prior modes of transportation? Some 78 percent of most current carpoolers drove alone, and 11 percent rode the bus.

Mass Media Advertising

Public Education

Overall, the current emphasis of Tri-Met's rideshare project has not changed dramatically: It is primarily focused on raising the level of public awareness and education regarding the benefits of ridesharing. The finding that 43 percent of carpoolers joined carpools within the last six months is strong evidence that substantial effort must be devoted to maintaining the existing carpool market. The high rate of carpooler attrition is partially due to changes in the personal circumstances of the individuals involved—i.e., changes of residence, job, or automobile availability. Clearly, Tri-Met has no influence over these exogenous variables. However, the finding also may suggest that not enough attention has been paid to existing carpoolers; perhaps they need to receive more positive reinforcement for their behavior, more support services, or prompter assistance in forming new carpools when they express dissatisfaction with their current arrangements. Finally, the high carpooler attrition rate reinforces the need to continually attract new carpoolers into the system.

To reach the general public, the mass media are still the most-effective vehicle. As in the early years, Tri-Met produces PSAs that are aired by the
Incentives and Services

In recent years, Tri-Met has devoted increased attention to the influence that incentives and services have on commuters' decisions to rideshare. Current programs in this area target specific market segments. Some examples are cited below.

1. Under the downtown parking program, carpools of three or more people can purchase monthly permits for $15.00 that entitle them to unlimited parking at any 6-h parking meter in downtown Portland. This program has generated more than $50,000 in revenues for the City of Portland and is currently at capacity.

2. Tri-Met is currently working with a private downtown parking lot operator to develop an incentive pricing policy for carpools. The operator will charge carpools $35.00/month, $12.00 less than the regular monthly parking charge. In addition, the operator will rent parking spaces to carpools only during the first two weeks of every month; during the remainder of the month, parking spaces will be available at both the regular and discount rates.

3. Tri-Met's park-and-ride program maintains 63 park-and-ride lots. Of the users of these lots, 11 percent are carpoolers; the rest are bus riders and users of off-peak carpooling. Incentives and services comprise approximately 35 percent of Tri-Met's total ridesharing effort.

Special Projects and Grants

Tri-Met's projects that test new ridesharing concepts are funded primarily by special grants. Without such monies, the rideshare project would not have the financial capability to test experimental, higher-risk approaches to rideshare marketing. Some examples of these special projects are as follows:

1. The North I-5 rideshare program was developed in response to serve peak-hour traffic congestion on the I-5 corridor between Portland and Vancouver, Washington. An aggressive marketing campaign consisting of carpool highway signs; carpool ramp-metering handouts; a toll-free carpool line; rideshare brochure inserts mailed with automobile registration renewal cards; driver's license renewals, and vehicle automobile emission inspection information; and other components is being conducted along this corridor. The total budget for the project is $180,000.

2. The special needs transportation rideshare program, scheduled to begin in mid-1981, will test the applicability of rideshare-marketing techniques—such as carpooling and vanpooling—to elderly and disabled markets within the local community. The total budget for this project is $95,000.

3. Promotion of the owner-operated vanpool program, discussed earlier in this paper, was also a special project. Approximately $20,000 in federal funds was used to design, produce, and mail out special promotional kits containing a letter, vanpool brochure, and stamped reply card (with pencil...
are accorded approximately 10 percent of the ride-

have continued to market to this group, by using

attached) to 18,000 van owners. The rideshare proj-

ect has continued to market to this group, by using

other inconveniences associated with the commute to work or

school. Yet recent research indicates that most
carpools (70 percent) go to destinations outside of

the central business district (CBD). Further re-

search is needed on the incentives that motivate
commuters who do not face parking and congestion
problems to switch from solo driving to ridesharing.

Another assumption that merits further testing
concerns the relationship of ridesharing to transit. Some transit systems are concerned that
ridesharing programs will erode their markets. How-
ever, Tri-Met's research indicates that only one in
five carpoolers is an ex-transit rider. Moreover,

the research indicates that the average carpool trip in the region is only

6.9 miles long.

Finally, the issue of the length of carpool trips
needs more research. While it has been assumed that
the longer commute trips are most amenable to ride-

sharing arrangements, Tri-Met's research indicates
that the average carpool trip in the region is only

6.9 miles long.

Refinement of Marketing Techniques

As research continues to produce valuable informa-
tion regarding the rideshare market, Tri-Met will
attempt further segmentation of the market; ride-

share promotional activities can then be targeted
more precisely to these segments. Some of these
areas are briefly described here.

Employer marketing is generally accepted as one
of the most cost-effective rideshare-marketing
strategies. Tri-Met's rideshare project has found
this to be the case but is now looking at a somewhat
different employer market in the future. As in the
case of the would-be rideshare market, the employer
rideshare program market is also approaching a point
where the prime potentials for success have been
creamed off. A prime potential employer would most
likely be a large employer (possibly 500 or more
employees), have parking problems, have expansion
plans with land or financial limitations, or be re-
locating. With the majority of these employers
identified and at some stage of contact and program
development, they are no longer new customers and
are more appropriately dealt with from a customer
service perspective, i.e., established communication
links, program expansion as appropriate, resupply
and/or updating of materials and programs, and
periodic recontact for follow-up and motivational
support.

Future employer rideshare marketing strategies
will most likely be directed to the smaller employer
(less than 300 employees). We can expect to be
meeting with more employers who might have the big-
employer problems but the overall size limitations
that keep them from being completely independent in

their solutions. The rideshare project's role will
become more involved in organizing and coordinating
several neighborhood businesses.

Another important segment of the future employer
market is the employer who does not have many, or
any, of the prequalifying problems or conditions
that would make them amenable to found-
project's contact or sales interest. This market will
involve much more systematic selling and advertising.

In general, future employer program work in all
areas will continue to emphasize specific goal set-
ting early in the program development phase. By
using various survey techniques, an employer, aided
by rideshare project staff, can quickly get involved
in determining the levels of participation and po-
tential in their business and in many cases improve
their commitment to a rideshare program.

The Tri-Met rideshare project's marketing program
to existing ridesharers focuses on new ridesharers
and has been similar to many other projects around
the country. Recent research has helped bring into
focus just how important customer service or main-
tenance efforts are. In the Portland area, of the
52,000 people commuting in groups of three or more
today, 43 percent will no longer be riding together
in 12 months. This will occur because of job
changes, residence changes, schedule changes, and
compatibility problems between ridesharers. Ser-

Ridesharing as a Public Policy

Thus far, ridesharing efforts have been adapted, or
retrofitted, to existing arrangements. The ex-
pansion of the role of ridesharing so that it becomes a
planning tool may not be far away. In Oregon, for example, the Department of Environmental Quality requires that conditional use permits be obtained for construction of buildings and facilities exceeding certain environmental standards; these conditional use permits require that a portion of the parking space constructed be devoted to carpools. Although limited to date, these public policy approaches to providing services and facilities that promote ridesharing should be continued and expanded whenever and wherever possible. In addition, there is a bill (House Bill 2257) before the Oregon Legislature that would enable the taxpayer to deduct payments received for nonprofit ridesharing services as well as ridesharing subsidies received from an employer from federal taxable income. At the national level, the U.S. Senate Finance Committee is considering passage of the Commuter Transportation Energy Efficiency Act, which would furnish a variety of tax credits and incentives to individuals and businesses involved in vanpool or carpool activities. Some features of this act are as follows:

1. A van purchased by an individual and used for ridesharing at least 50 percent of the time would be eligible for a 15 percent tax credit.
2. Businesses and organizations operating vanpool and/or carpool programs would receive tax credits for the costs of purchasing or leasing vans, assigning personnel to manage the programs, computerizing the matching of employees, providing liability insurance for ridesharing vehicles, and other services.

A rideshare vehicle operating at least 176 days/year and carrying an average of three persons would receive a gasoline tax deduction.

Role of the Private Sector

As the social and economic climate of the nation creates pressure to reduce the role of government in setting, enforcing, and funding local policies and programs, the private sector will assume increasing importance as a target of rideshare-marketing efforts. Strategies to promote the message that energy conservation is profitable to the private sector must be developed and refined. The success of the rideshare-marketing efforts undertaken by programs around the country may well depend ultimately on the extent to which private businesses, public institutions, and individuals can be motivated to participate in ridesharing arrangements. If sufficient momentum can be generated, ridesharing systems will multiply without large public bureaucracies to organize and fund them. For the foreseeable future, however, Tri-Met will continue to send the basic message to businesses and individuals: Ridesharing pays.

Management and Organizational Issues of Ridesharing Programs

Richard H. Bradley and Ellen M. McCarthy

The central position of this paper is that ridesharing is essentially a set of management-organizational strategies aimed at altering individual mobility patterns to achieve increases in productivity in our transportation system. Although ridesharing does encompass technology and facilities, the fundamental challenge of ridesharing is to develop a management-organizational approach that combines the various ridesharing tasks in the most-effective way. These management-organizational elements are important aspects of ridesharing and have not received sufficient attention.

Such a set of strategies, whose application is becoming increasingly important to a variety of other transportation planning and operating agencies, establishes a process through which the use of vehicles and individual trip patterns can be coordinated and organized so as to encourage efficient use of both capital and energy resources. This approach is in turn coordinated with other transportation planning and operating agencies, such as management programs, roadway management and construction, and public transportation. These can then be coordinated with community, land use, and economic development strategies to improve access to opportunities for all citizens of a region in the most cost-effective manner.

Given this central emphasis on management and organizational strategies, it seems critically important that organizational alternatives, which include the way in which the functions and services are provided and structured, should be presented clearly and researched carefully. It is ironic, however, in spite of the importance of organizational strategies, that inordinate attention is often focused on the technical issues—the kind of matching services, the design of the van, or the kind of vehicle insurance—in establishing a ridesharing program and training people to run and manage such a project. Perhaps this focus is the result of the dominant impact that technical competence has had in other areas of transportation and "baby brother" (i.e., ridesharing) is seeking equal acceptance by the rest of the family. This is doubly ironic because the evolution of ridesharing programs has evidenced a great deal of experimentation and thus a wide variety of approaches, many of which are quite creative and innovative, with no shortage of the technical brilliance that has characterized other transportation fields. What is now required is a systematic review of these approaches to determine the most promising among them and to identify gaps where additional improvement is necessary.

It is the intent of this paper to review this evolution and to frame these organizational issues, which include such traditional functions as marketing, provision of matching services, providing vans and/or third-party pool operation, information brokering, as well as newer functions such as training of company ridesharing coordinators, dissemination of information about energy and air-quality transportation programs, advocacy for changing corporate or public policy, provision of transportation
The richness and diversity of service functions, management strategies, and organizational options are also important for future development in that they set the stage because they are as much a part of the restaging of the general field of transportation planning and implementation, of which ridesharing is a part. Until now, it has been characteristic to look at transportation as a supply function—that is, the issue was to provide as many roads, trains, and cars as necessary to meet expanding demand. More recently, given energy and capital constraints, the issue has shifted to the management of demand for transportation services and mobility. The term transportation system management defines the broader set of emerging strategies within the public sector to achieve this end. Originally a set of planning activities, the focus is shifting to implementation and operation. Subsequently, new management institutions, such as ridesharing programs, are emerging to carry out these activities. There is equal concern in the private sector to find greater productivity in transportation investments and, as a consequence, both public and private organizations have an interest, often in partnership, to share knowledge about management and organization developments.

In order to frame these developments, this paper will proceed by attempting to establish an illustrative historical review of the evolution of service functions and transportation efforts in the United States during the past decade. This is intended to provide a framework for a discussion of the multiple management options for providing these services, such as performing them in-house, through contract, by consortium, etc. This can be used as a decision matrix for purposes of developing a program, as well as providing guidelines on which to project additional options for the future, based on evolving needs for greater energy-efficient transportation. These options along with their potential advantages and disadvantages are then examined. The next step, after the selection of various options, is to look at the issue of how an agency should be organized, both internally and externally, and how a management system should be developed to achieve maximum effectiveness. Finally, this paper will address the important issue of recruiting staff with managerial and entrepreneurial capabilities and training them to carry out these organizational responsibilities.

HISTORICAL DEVELOPMENT

Ridesharing is not a new phenomenon. For years, and perhaps for centuries, people have made collective arrangements to share rides. What is new are the attempts within the past decade to intensify and organize these more informal arrangements. We should note here that an historical perspective is difficult to provide. The history is not as linear as a narrative description almost necessarily makes it out to be. In fact, the early stages of ridesharing are best explained by a variation of the "big bang" theory of the origin of the universe—the 1973-1974 oil shortage sent shock waves through the commuting public and provided the impetus for a number of different ridesharing efforts.

Before the winter of 1973-1974, public efforts had focused on the implementation of preferential treatments for high-occupancy vehicles, such as the Shirley Highway (Virginia) and Lincoln Tunnel (New York-New Jersey) projects. Private efforts were largely limited to provision of means for employees to contact each other if interested in sharing rides, and another early form of ride exchange were of bulletin boards or house organs for employees to advertise for potential pool mates. In a few limited instances before the 1973-1974 gasoline shortage, employers provided additional services in terms of marketing ridesharing. This generally occurred, however, only where there were external forces such as parking shortages, labor force availability problems, or relocations that caused the employer to see ridesharing as directly in his or her self-interest. After 1973-1974, a number of additional companies began the provision of more formalized matching and marketing programs, although even these efforts would be more prevalent when use of ride boards or use of bulletin boards or house organs for employees to advertise for potential pool mates.

The introduction by the 3M Company in Minneapolis of the concept of vanpooling provided a distinctly different feature and new focus to employer-based ridesharing efforts. The concept quickly spread to other companies including CONOCO, ARCO, Tennessee Valley Authority, and Southern New England Telephone Company. This introduction of the provision of resources to purchase, lease, and maintain vans added a new and different function to the provision of ridesharing services. After vanpooling, company efforts spread as well to a general brokerage function for transportation services, including provision of information on conventional transit as well as assistance in forming buspools, carpools, and vanpools.

The passage of the Emergency Highway Energy Conservation Act of 1974, which provided federal funds on a 90/10 matching basis to promote and provide ridesharing information, provided a major impetus of public ridesharing efforts. The first ridesharing demonstration program was approved in January 1974 and, by October 1974, 80 carpool demonstration programs, totaling close to $9 million dollars, had been approved. By July 1976, the number of authorized programs had increased to 88 with funding at more than $11.5 million. Currently, ridesharing programs of greatly varying size and scope exist in more major metropolitan areas and in increasing numbers of small urban and rural areas.

It is worth noting at this point from an organizational point of view that the concept of ridesharing activities were usually provided through a small office that had a staff of one or two. Usually, these individuals had other corporate responsibilities aside from employee transportation and in other cases they had responsibilities for developing air-quality improvement programs, implementing vanpooling programs, and other energy issues. In these latter instances, these activities foreshadowed the evolution of additional service functions. The central point here is that these activities or functions were organized in very simple ways—in large part because of matters of scale—and today still represent the basic format that is being urged on companies or public agencies as they begin building ridesharing programs. Even today in the home office of the Aetna Insurance Company in Hartford, Connecticut, with 50 percent of
its 11,000 employees using ridesharing to get to work, the company needs only two full-time employees, costing $60,000 in staff time, to manage the program. (Note: Aetna spends more to support ridesharing, computer time, etc., but only has a limited full-time staff.)

It is important to note that these programs, however simple in organizational format, developed a set of external organizational roles that were essential. First of all, as has been noted many times, there had to be a strong commitment from the top. Someone, in other words, who was not directly involved in the provision of service, empowered the program. Ridesharing personnel had to build a case for continuation of that support.

Second, as ridesharing programs provided information brokerage functions or became engaged in air-quality improvement programs, new relationships with public-sector agencies needed to be established. The relationships may have been simple and direct, perhaps in the form of sitting on advisory bodies, but these activities represented efforts to be related externally as well as internally.

In the mid-1970s, public agencies developed an interest in ridesharing and began to venture to establish organizations that would capture or extend more of the benefits of corporately supported ridesharing programs. The basic set of services and functions—matching, marketing, and van management—as well as roles, appears to have been modeled on those established in private corporations. The initial set of targets for these services, however, was considerably different.

The first attempts to organize ridesharing programs in the public sector were to use the basic service functions of company programs but to apply them to a wider area of employment, often encompassing an entire metropolitan area. These organizations had small staffs and large ambitions. It became apparent, however, that it was exceptionally difficult to effect matching given the wide diversity of origins and destinations, much less effectively market this service to users.

The second stage of development seems to have flowed from the first in terms of realizing that successful efforts for such a purpose were major employers who had not decided to establish a ridesharing effort. In effect, these public-sector agencies offered to provide a set of services that included limited marketing, matching, and sometimes van management in place of a program run by the company. The ridesharing program developed by the State of Connecticut typified this two-step evolution in that it started its statewide program by providing matching for anyone who wished to return questionnaires with their car registration forms and subsequently began targeting matching services to major employers. In all instances, the basic service functions were usually performed in-house.

The third step in the evolution of public ridesharing programs appears to have resulted when these programs began to grow larger in scale in terms of areas served or number of clients engaged and required increased staff resources. Whereas a single individual could perform many functions in a smaller program, staff roles became more specialized as agencies expanded. This expansion in scale, which is typified by an organization such as Commuter Computer, was simultaneously matched with the development of specialized consulting services to provide such services as van management, marketing, and computer matching on a contractual basis. At the same time, public agencies found that a "privatized" approach was often better received; yet, the goals of the program met a public need. These organizations generally continued the trend toward specialized functions and contractual services observed earlier, adding public affairs functions, which have also been added in many public ridesharing agencies.

Over the immediate horizon, however, other service functions appear to be taking shape. These are discussed later in this paper. What is important to note here is that the nature of ridesharing program organization has evolved significantly since the early 1970s, and it must continue to be reviewed as dynamic rather than static. As of yet, it is difficult to define the organization that will result from new services or functional developments, but there appear to be a number of experiments now taking place out of which will evolve new organizational arrangements.

Publicly supported ridesharing organizations have needed to attend to external organization as they evolved internal service structures. Because many of these new services as well as the more conventional functions required interorganizational activities, many public and not-for-profit organizations have found it necessary to attend to organizing boards of directors or advisers so as to give them maximum access and support from major public agencies and private employer groups and/or decision makers. In some cases, boards were established with many corporations represented; in others, a few but influential agencies became sponsors. In like fashion, there was a recognition in corporate programs that the agency had to be supported from without if it were to be successful.

At this point, it is worth noting that private-sector corporate programs, particularly those in very large corporations, as they have entered the business, often are those who have been, at a grander scale, are evolving their own management strategies. They too are looking at purchasing services from third-party providers for either marketing or matching or vehicle procurement, but, more importantly, they have begun ways of managing ridesharing, choosing the kind of management committee or consultants that can support management committees who in turn set goals and objectives for increasing employee ridesharing and monitor this development with computer-based data. The Boeing Company located in Seattle is an excellent example of this approach.

In conclusion, it appears that we have arrived at a point where services and functions performed by a ridesharing agency or a company ridesharing program have become diverse in service options and organizational structures. This has resulted from a recognition that there are multiple employment transportation needs and different corporate or community priorities that determine what options to choose. It is clear, however, that at the present time there is a need for mechanisms and models to help new or existing agencies make strategic decisions about the ways to provide and organize the important functions and it is hoped that outlines such as the one provided in this paper can be of assistance. At the same time, little research has been done on the relative effectiveness of these options and it is hoped, therefore, that the outline also offers a rich agenda for purposes of new research. The intent of the next section of
the paper is to lay out these options in greater detail.

RIDESHARING SERVICES

There are a number of services that could be considered a legitimate part of ridesharing efforts. The following list aims to suggest a broad selection of these but is by no means the complete set of services that could be offered. The first four encompass services traditionally offered by ridesharing agencies, while the remaining eight reflect new directions in ridesharing efforts around the country.

Marketing

Marketing is the most common service provided by ridesharing agencies. In this context, marketing is usually synonymous with promotion of ridesharing as a superior way to commute; it is generally directed at the general public, employers, and employees. Activities such as developing promotional literature, meeting with employers and employees, staging public events, and preparing news releases are typical of those performed under the marketing service function. It is important to remember, however, that marketing actually encompasses a full process beginning with market research, leading to product development, then promoting and monitoring of sales or use of the product. A small number of ridesharing agencies are now beginning to consider marketing in this more-dynamic sense, seeking to develop an understanding of the market for ridesharing services, the position of those services in the overall range of transportation choices, and the effectiveness of various marketing approaches in penetrating the applicable market segments. Often ridesharing agencies will monitor and evaluate the success of their efforts in forming carpools or vanpools but neglect specific information gathering as to the effectiveness of different marketing approaches.

 Provision of Matching Services

Providing matching services is a fairly common function among ridesharing agencies. Matching is most often accomplished by using computer packages for this purpose, but manual matching systems have also proved effective. Unfortunately, in many ridesharing agencies, the matching system, instead of being a complementary part of the overall package of services, drives all of the other activities. Considerable attention and resources have been devoted to the development of highly sophisticated commuter matching systems. It seems only reasonable then to devote a commensurate amount of effort to clearly thinking through how that matching process can be best integrated with the other activities of the ridesharing program. Such issues as the importance of a centralized regionwide data base, the amount of resources to be devoted to updating that data base, the best ways to combine marketing strategies and data-collection efforts, etc., must be considered.

Vanpool Provision and Operation

The explosive growth of vanpooling has resulted in a corresponding increase in ridesharing agencies that perform the role of van provider, sometimes contracting with a private company to provide vans and handle vanpool administration. This is particularly apropos for ridesharing programs that deal with multiemployer sites. As the vanpool market continues to expand to encompass individual owner-operated vans and requests from corporations for third-party administration of vans provided by the employer, these activities of ridesharing agencies are broadening accordingly. In addition, developments such as sedanpooling and expanded buspooling are being investigated by a number of ridesharing experts.

Information Broker Regarding Transportation Options

An early emphasis on carpooling and vanpooling alone has been largely supplanted by the recognition that ridesharing encompasses all alternatives to the single-occupant vehicle. Thus, many ridesharing agencies provide information as well on conventional transit routes, schedules, options for transit passes, and other incentives. Some programs provide personalized transit information as part of the match list. Others provide route maps and schedules or use transit agency personnel in the ridesharing campaign at the work site. Some programs offer transit promotions such as a free ticket. A small number of follow-up evaluations of ridesharing agency provision of transit information and promotion have shown some dramatic results in increasing transit ridership.

Training of Company Ridesharing Coordinators

Evidence mounts about the importance of a personalized approach in convincing individuals to change commuting modes to higher-occupancy vehicles. In addition, there seems to be general consensus on the importance of promoting ridesharing, not on a one-shot basis but with long-term maintenance in mind. Thus, many ridesharing agencies have seen the need to establish programs to train company ridesharing coordinators. They feel that coordinators can be far more sensitive to opportunities for the enhancement of company ridesharing efforts than can employees of an area-wide ridesharing agency. Their day-to-day contact with employees provides a continuity of ridesharing promotion that cannot be matched by ridesharing agency staffs either.

The subject matter, techniques, course length, and teaching approaches in these programs vary substantially, though we are unaware of any evaluations that have been performed to identify the most-successful attempts. In some instances, these training sessions have led to the formation of associations of company coordinators, either organized by the ridesharing agency or on the participants' own initiative. These associations provide a forum for mutual problem solving, information sharing, advocacy for transportation system improvements, and career advancement. The Joint Institutional Transportation Brokers Association, a group of transportation coordinators for hospitals, universities, and similar organizations in San Francisco, even pooled resources and developed a high-quality slide show and promotional display.

Flexibility in this area of providing training is important, however. In multiemployer locations with small numbers of employees, the ridesharing agency itself might need to function as a company coordinator, since the employers are not large enough to provide such a function in-house. In addition, many companies do not view involvement in employee transportation as a legitimate company function, and may be reluctant to designate a staff person to serve in that role. Besides providing training, a ridesharing agency may have to sell the need for a coordinator.
[A review of ridesharing programs around the country leads us to an inevitable conclusion: If ridesharing agencies confine themselves to only activities described previously in this paper, their ability to have a substantial impact on commuting behavior may be very limited. The following services lay out a range of activities directed toward a larger goal—the creation of a climate to foster ridesharing. The achievement of this goal is clearly beyond the scope of public action alone.

The decisions made by private employers on issues ranging from employment location to parking provision to provision of ridesharing programs all have an impact on the efficiency and effectiveness of the urban transportation system. Often, however, employers are not aware of the impact of their decisions or of the scope of public or private programs directed at energy, air-quality, or transportation concerns. The goal of local ridesharing agencies should be to encourage the intelligent and effective participation of the private sector in transportation system improvement by increasing their awareness of events, actions, and policies that directly or indirectly affect their interest as employers and corporate citizens. Since ridesharing is one of the few programs in these areas that involves direct contact with private employers, it would appear to provide an excellent opportunity for private-sector involvement in these larger concerns.]

Dissemination of Information About Energy, Air Quality, and Transportation

Improving air quality and conserving energy are two areas of vital concern in which the impact of an employer to become involved or not in ridesharing has a significant effect. A ridesharing agency can assist employers to understand the related issues—the problems, the social and economic costs, and the various public and private actions that are recommended or required to address these issues. This can be done through the preparation of position papers, presentations, and newsletters. It can be built into the justification of the ridesharing agency's services in general so that it permeates all of the communication carried out by the agency.

Advocacy for Changing Corporate or Public Policy

There are many instances in which the unique position of ridesharing agencies in serving both a private and public function should logically lead to the adoption of an advocacy role by the ridesharing agency for public and private policies that contribute to the overall goals of air quality, congestion reduction, and energy conservation. (Advocacy, in this instance, refers not to public protests but to persuasion of public or private actors to see policy change to be in their enlightened self-interest.) Contrary to the belief by some that this may involve ridesharing agencies overstepping their bounds, there is in fact a clear argument here to the role played within a corporation by its in-house transportation or ridesharing coordinator. Just as a company coordinator becomes an advocate for ridesharing within the company, supporting changes in policies or provision of incentives to encourage ridesharing within the company, a ridesharing agency stands in a similar position with regard to multi-employer sites such as downtown areas or industrial parks, or even, in a larger sense, the entire region. In such a role, ridesharing agencies should actually support changes in transportation policies, transit services, and other areas that can play a substantial role in creating the climate for ridesharing mentioned above.

Developers, for example, constitute an important target group for local ridesharing agencies. They have a natural incentive against building large numbers of parking spaces in conjunction with new development; these parking spaces cost a significant amount of money. Since studies have shown that parking provision ties in closely with the success of ridesharing efforts, developers should be encouraged to work with perspective tenants to establish ridesharing programs that will reduce parking requirements. In addition, developers should be encouraged to design parking facilities with ridesharing in mind: appropriate ceiling height to accommodate vanpools, design that facilitates enforcement of preferential parking spaces for high-occupancy vehicles, and provision of parking at market rates for users.

Correspondingly, planning commissions, parking authorities, transit agencies, downtown councils, or chambers of commerce are other examples of groups who may need benefits of the gentle persuasion that a ridesharing agency can provide. The Seattle King County Commuter Pool provides an excellent example of this approach. If it successfully advocated changes in taxation for vanpools and a ridesharing review of requests for permits to build new buildings. This review power allows the agency to condition a permit on the provision of a ridesharing program or other transportation measures for tenants' employees. The Commuter Pool has gone a step further and is planning workshops for lessees to enable them to present these conditions in a positive light to prospective tenants.

Provision of TSM Consulting Services

Research on ridesharing programs indicates a greater likelihood of enthusiastic support from employers for programs within their companies if the employer views the ridesharing effort as solving some of his or her problems. Thus, while a ridesharing program may in and of itself provide substantial benefits to the employer, the package can often be sweetened by the provision of consulting services on specific TSM measures, such as parking management programs, flextime coordination of transit schedules, channelization of intersections surrounding the employment site, or installation of shuttle services between buildings or between the employment site and transit stations or commercial areas.

While these kinds of consulting services can be directed toward the actual corporation, they may also be useful to public agencies, or representatives of private interests like chambers of commerce or downtown councils who need to consider TSM measures to realize broader needs. For example, zoning and municipal parking policies may need to be altered in order that parking management plans be implemented to support ridesharing projects. This, in turn, may be related to potential alterations in public transit services in order to allow for more commercial development in a downtown area with limited space. Ridesharing agencies can help serve all of these needs.

Assistance in Implementation of Flextime Programs

While flextime should be certainly considered among the TSM consulting services mentioned above, its importance for ridesharing suggests that it should be dealt with separately here. Demonstration programs in Seattle and San Francisco illustrate the substantial boost to ridesharing efforts that can be provided by flextime programs. In addition, a successful flextime program can contribute to reduction in peak-hour crowding on transit, in turn making public
transportation a more attractive high-occupancy-vehicle alternative. For employers, flextime provides not only a transportation benefit in terms of reduction of on-site congestion but can pay substantial dividends with regard to increases in productivity and decreases in tardiness and sick days. Since ridesharing agency staff should be alert to the provision of any service that enhances its attractiveness to the employer and contributes to success in switching commuters to higher-occupancy modes, assistance to companies in establishing a flextime program would appear to be an important tool in the kit bag of ridesharing agency personnel.

Planning Assistance for Improvements in Urban Transportation System

Through its access to employers and its data base of commuting patterns, the ridesharing agency possesses important information, skills, and resources. These could prove valuable for public agencies charged with the implementation of high-occupancy-vehicle lanes, park-and-ride lots, reverse commuting programs, and elderly and handicapped transportation programs. These public efforts, in turn, can enhance the effectiveness of the ridesharing effort.

Provision of DECAT Training

The U.S. Department of Energy (DOE) has developed the DECAT program. While not directly related to ridesharing, the DECAT program has been shown to result in impressive energy conservation by those who have received training and, thus, is certainly complementary to the energy conservation goals of ridesharing agencies. In addition, provision of such training to ridesharing users could further increase their energy savings, and provision of such training by the company to its fleet drivers could both save energy and increase the range of services provided by the ridesharing agencies that can be viewed by employers as having direct payoffs for the company. Ridesharing agencies could either simply provide information about the availability of DECAT training or, by sending a staff member through the DECAT program, could provide the training directly.

Provision of Air-Quality and Energy Planning

The Federal Energy Emergency Standby Regulations, promulgated in draft by DOE some months ago, oblige employers to provide travel reductions by their employees during energy emergencies. In addition, many local areas have imposed restrictions on employee travel during periods of air-quality alerts. In these instances, another opportunity is presented for ridesharing agencies to provide services related to ridesharing that provide direct benefits to employers and enhance the attractiveness of the ridesharing program. Ridesharing agency personnel can either work directly with employers on these matters or provide information to employers on where they can receive assistance in formulating contingency plans for their own employment sites. In addition, ridesharing agency personnel can provide valuable input to public agencies who are planning programs in either of these areas.

ORGANIZATION

As the previous section explains, the range of services that can be considered appropriate for ridesharing agencies is a broad one. While this paper argues that such services are complementary to and appropriate for ridesharing agencies, it should be made clear that these services do not all have to be provided by the staff of the ridesharing agency. In fact, we would argue strongly that an important decision in the initiation or continuation of ridesharing programs should be both the determination of the service mix and also the determination of the logical provider of such a service.

Strong consideration should be given to which functions and services can be performed outside of the ridesharing agency, both because of the limited resources of ridesharing agencies and also the greater appropriateness of other institutions or entities to provide many of these functions or services. The matrix illustrated in Figure 1 attempts to display the range of services and individual tasks that can be considered by ridesharing agencies and also the various organizational alternatives for providing them.

The major organizational alternatives considered are:

1. In-house (ridesharing agency staff),
2. Contract,
3. Corporate or institutional donation,
4. Individual employers,
5. Public agency,
6. Employee associations, and
7. Employer-based groups.

The choice of a particular provider for each function or task has significant ramifications with regard to quality of service, ease of administration, budget levels, and other factors. The specific trade-offs are rarely clear, however, and research needs to be done on the advantages and disadvantages of various service-provision alternatives. This section of the paper presents a general description of the pros and cons of various provider options. One overriding consideration that should be kept in mind is the goal of achieving a true public-private partnership with ridesharing programs and with private-sector support and assistance maximized to the extent practicable and appropriate.

In-House

What emerges clearly from the examination of the programmatic elements noted above is the high degree of service personalization and institutional change necessary to assure employer commitment and to change employee travel behavior. This tends to argue for a high in-house staffing level, subject to the availability of office space and funds. Since it is likely that employer requests for service will grow from a low initial number, some economies can be achieved through phasing of staff build-up in the case of new agencies. Temporary staff can be added to cover peak demands in the event of another short-term gasoline shortfall or if a particularly large employer or group of employers needs quick attention.

The major advantage of in-house service provision is a high level of control over activities and performance. In addition, the evolutionary nature of ridesharing argues for the quick feedback and immediacy of contact achievable when staff responsible for program management and planning is closely connected with program operations. However, this evolution can also argue strongly against building up a large ridesharing bureaucracy, with vested interests in one particular form of service provision—that is, the in-house approach.

Contract Provision of Services

The contracting option is most useful for those program areas that require highly specialized services or that are not required at a uniform level over
Figure 1. Summary matrix of ridesharing related services against organizational options.

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<thead>
<tr>
<th>Ridesharing Functions</th>
<th>In-House</th>
<th>Contract</th>
<th>Corporate Donation</th>
<th>Employer</th>
<th>Public Agency</th>
<th>Employee Association</th>
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<td>d. Software Installation</td>
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<td>e. Data Entry and Execution</td>
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<td>f. Density Plots</td>
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<td>g. Statistical Update</td>
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<td>h. Hardware Provision</td>
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<td>e. Employer Contract</td>
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<td>f. Employer Follow-Thru</td>
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<td>g. Employer Incentive Provision</td>
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<td>h. Telephone Matching Service</td>
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<td>i. Civic Awareness</td>
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<td>j. Public Awareness</td>
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<td>3. Vanpool/Buspool Option</td>
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<td>c. Rider/Driver Identification</td>
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<td>d. Vehicle Maintenance</td>
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<td>e. Legal/Insurance Services</td>
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<td>f. Vehicle Records Management</td>
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<td>j. Driver Training</td>
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<td>4. Transportation-Related Assistance</td>
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<td>c. Employee Incentives</td>
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<td>d. Traffic Engineering Improvements</td>
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<td>i. Reverse Commuting</td>
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<td>a. Assistance to Planning Agencies</td>
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<td>i. Energy/Air Quality Assistance to Employers</td>
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<td>h. Contract Administration</td>
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<td>c. Evaluation</td>
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time. Examples of the former would include design of promotional materials, technical assistance to employers in implementation, marketability, work-hour programs, and operation of the third-party vanpool program. Services for which demand is not constant would include keypunching and data editing, auditing, and possibly data entry and execution. One major drawback of contracting is the generally higher costs of this option; however, if used judiciously, it can be cheaper in the long run than hiring full-time specialized personnel. One additional disadvantage can be a loss of control, though this can be minimized through proper contract design and administration.

Corporate or Institutional Donations

In order to provide the broadest range of service possible, ridesharing budgets can be augmented by the donation of various services or facilities. Also, it seems likely that private-sector commitment to the success of ridesharing efforts will be maximized if the private sector feels that it has a (financial) stake in the program. The major drawback with this option is reliability, due to the lack of direct control or contractual agreement covering the donation. This concern can be mitigated, however, by concentrating on fixed facilities, such as space or computer hardware, and by giving potential donors a clearer (perhaps written) estimate of the amount of service required, such as secretarial assistance or computer processing time. For budget development purposes, it should be noted that private-sector in-kind goods and services can count as a local match for federal funds.

Individual Employer

Since the ridesharing program provides significant benefits to participating employers, it makes sense to ask the employer to provide a reasonable amount of support in return. In addition, the employer's enthusiasm and promotion to his or her own employees may be enhanced by the knowledge that company resources have been invested in the effort. It is important to bear in mind that participation in the program does commit the employer to a certain level of involvement with regard to in-plant administration and that the ridesharing effort will be significantly enhanced by the commitment of additional resources in the form of employee incentives. However, ridesharing programs will not be well served if the cost of employer participation is set too high and discourages their involvement.

To achieve the most-effective use of employer resources, the services requested should probably be as site-specific as possible. These would include the donation of machine-readable (computerized) rosters of all employees or, failing that, the geographic coding of employee home addresses and work locations; the arrangement of a space and time for presentations to all employees about the ridesharing program; provision of space and time for employees to meet face to face after matching lists are prepared; promotion of the program through house organs, poster placement, and pay envelope stuffers; preparation of a letter to all employees urging their participation; passing the word to middle management that the success of the program is an important company priority; provision of a variety of incentives to employees, including preferential parking for ridesharing participants, subsidization of transit passes, carpool parking, or vanpool fares; and other custom-designed mechanisms. Large employers may also be willing to provide assistance to other corporations in the establishment of company programs or might be willing to call fellow employers as outreach for the ridesharing programs in their companies. Sometimes a ridesharing agency, such as The Rideshare Company in Hartford, draws up a contract with the employer that stipulates both what the agency will do as well as the employer. The contract is useful in both informing the employer as well as eliminating subsequent misunderstandings.

Public Agency

Success in increasing the average number of vehicle occupants will contribute to the achievement of a number of public policy goals, such as conservation of energy, reduction of congestion and air pollution, and minimization of the need to construct new parking and road facilities. It is not surprising, therefore, that there has been substantial public-sector support for ridesharing. Since the goal of maximum privatization has been proposed for ridesharing, additional major investment of public resources should not be routinely expected, particularly in the light of the fiscal constraints likely to prevail in the public sector for the foreseeable future.

There are some roles, however, which public agencies are uniquely suited to provide. Given the uncertainties of vanpool fuel-allocation guarantees due to federal deregulation, it is even more important for states to develop plans for dealing with energy emergency situations, especially since these guarantees were significant incentives for employer participation. Various public agencies could provide a wide range of technical assistance to employers in conjunction with ridesharing efforts, further enhancing the program's attractiveness to employers through implementation of preferential lanes or parking for high-occupancy vehicles, use of regulatory powers to encourage ridesharing (such as encouraging further insurance premium reductions for carpoolers), provision of technical assistance in computer-matching software installation, and perhaps provision of computer time or public equipment for the matching process.

Employee Associations

Employee associations, where they exist, are generally loosely organized with minimal financial capability. As such, they should not be counted on for substantial support. However, in some instances, where employers have been reluctant to participate in vanpooling programs, the employee association has dealt directly with third-party vanpool operators. Employee associations can promote the program through personal contact and publicity in newsletters and on employee bulletin boards. In addition, employee credit unions can be encouraged to provide low-interest loans for the purchase of vans by individuals or the association.

Employer-Based Organizations

Transportation improvements have increasingly appeared high on the list of priorities set by chambers of commerce and other employer-oriented groups. Since ridesharing is a transportation program with great appeal to the private sector, these organizations may be interested in forming private nonprofit corporations to provide ridesharing assistance; contacting member firms, such as ride-sharing clients, financial, or in-kind assistance; and supporting the ridesharing agency in its advocacy and planning roles.

Unions

Many employers with unionized employees have ex-
pressed reluctance to participate in ridesharing programs because of fears of problems from the union. Others establish programs but express similar fears with regard to provision of employee ridesharing incentives. Many employers have also reported lack of success in achieving pool formation among unionized employees, even when nonbargaining units or groups have been enthusiastic. It seems clear that the exploration of ways in which to involve unions in ridesharing and get their approval would be a valuable research area.

**ADMINISTRATIVE AND MANAGEMENT SYSTEMS**

Having laid out both the variety of services as well as the variety of mechanisms through which they can be organized, it is important to conclude by referring to a discussion of administrative issues of the ridesharing program.

While it is important to make the appropriate determination of service and means of provision of the service, once the decision has been made an organizational structure needs to be developed. By and large, because ridesharing organizations or departments are small, one or several individuals assume the responsibility either for providing the service directly or managing a third-party contract. As programs have grown, however, the problems of administration and the development of line and staff functions are a matter requiring greater attention. Questions concerning optional size of staff, span of control, centralization or decentralization of decision making, formulation and standardization of procedures, and degree of staff specialization are and will be important for expanding programs. While there are relatively few data on this subject, it would appear that a good program might be characterized as relatively small, highly personalized, flexible, yet operating with or through a defined set of procedures. These are qualities that seem to have been essential for successful programs in the past.

These administrative-management concerns will become even more critical as other transportation agencies engaged in planning or operations adopt demand management techniques and programs to implement other kinds of TSM actions. Ridesharing, which is itself a TSM activity, can be a useful arena out of which management and organization approaches and programs can be modeled for broader consumption. In general, a new emphasis on smaller-scale management actions is beginning to emerge as a characteristic of successful TSM projects. Rather than depend on macro-level planning activities to spur changes in the efficiency of the transportation system, changes are emerging as a result of initiatives undertaken by street managers, parking management specialists, and ridesharing coordinators. The programs of which these people are a part are typified by being less bureaucratic, more integrative, and more limited in scope of action.

Because ridesharing programs have been small in scale, the issue of using management techniques and management strategies has required minimal attention, but as programs grow in scale some of the classical management techniques such as the need to establish clear statements of goals and objectives, effective internal communications systems, effective control systems, strategic planning processes, and program evaluation need to be applied to these organizations.

In particular, the planning and evaluation management functions are most applicable to ridesharing organizations and for which there appears to be the most immediate need for greater attention. There is a different and more complex planning process required, one which is strategic in intent, as ridesharing programming comes to have greater use to different interests, such as developers, transit agencies, etc.; as it becomes more integrated with other TSM actions; and as its markets broaden. Likewise, different criteria need to be developed and new measures established so that activities can be evaluated. In some cases, measures can be stipulated in terms of number of vans, number of carpoolers, cost/successful match, and reduction in vehicle miles of travel (VMT); in other cases, particularly as the actions of a ridesharing agency are focused on creating a climate supportive of ridesharing such as assuming advocacy positions or offering TSM consulting services, different new criteria will need to be developed. The important point is that planning and evaluation need to be directly linked to service and function.

In short, there is a need to manage systematically. If we are to manage a variety of transportation projects for purposes of increasing productivity, then general management approaches and skills will be of the utmost importance. To date, there is little evidence of activities in this area or any research initiatives.

**EXTERNAL ORGANIZATION**

As in the case of the choice of service and the provision of these functions, there is also a range of options in which a ridesharing organization can organize itself in an external fashion. These options can be framed in terms of a set of questions. Within the public sector, for example, should such a ridesharing program be placed in the mayor's office in order to get a high degree of visibility? Should it function within a line agency, such as a department of transportation? Should it exist within the public transportation agency? Or should it become a department in itself?

Similarly, in the private sector, a number of questions can be asked as to the appropriate positioning of a ridesharing department. Should it be in the office of personnel? Should it be part of employee services? Or should it exist independently? After which option is selected, there can be advantages and disadvantages depending on particular contexts. For example, if a ridesharing program were placed in a public transportation agency, it may find itself competing with traditional functions, which are to lure people into buses and trains. In addition, placement within a large, conventional transit agency may hamper the development of a more entrepreneurial approach to private employers, given the traditionally hierarchical, bureaucratic orientation of these organizations. On the other hand, such placement may enhance a public transportation agency since all forms of mass transit are collective in nature as is ridesharing. Making an independent agency means the problem of conflicting goals but not give it access to staff or department resources for which it would normally have access as part of a larger entity. In all instances, the relationship to top management needs to be clear and conflicts minimized.

An agency is to be independent of parent or sponsoring organization—in the form of a not-for-profit corporation—the composition of the board of directors needs to be carefully considered. Choices can include establishing a large board of directors with 40 or 50 member-companies serving on the board; or members of the board could be few but powerful institutionally so that the board has control over other institutions. The choice of board members is equally important. Obviously, the more prominent, the more effective. However, this effectiveness may be
constrained by demands on this individual's time. Of equal importance is the role of the public sector in terms of representation. While the public sector has financial resources and influence in other transportation matters, such influence can be too dominant and curtail the independence and flexibility that may be necessary to develop an effective ridesharing program. Even if the ridesharing effort is part of a public agency, private-sector representation on some type of advisory board can be extremely effective as a way to ensure a true public partnership. The Portland, Maine, ridesharing program is a good example.

The purpose of this section, therefore, is to note that there is an equal array of options and choices in terms of developing a ridesharing program. These decisions will affect and be affected by financial resources, client for the service, future plans for development, and service effectiveness. As in the case in dealing with internal organization matters, a great deal needs to be learned about which of these options is most effective.

STAFFING

It appears that ridesharing requires a special kind of staff and that such a staff is central to the success of the program. It may be argued that inappropriate attention has been given to considering organizational dynamics in establishing a ridesharing program. However, even if a program is well organized, without a competent, enthusiastic, and entrepreneurial staff, the organization may fail to realize its potential.

No doubt a service function sets the agenda for the necessary professional skills. This can include such skills as marketing, use of computers, transportation planning, public relations, management, and such things as knowledge of the public development process and/or the making of public policy. However, more important than the specific skills appears to be a general orientation that these individuals will bring to the exercise of their skills. Because ridesharing is so predominately a marketing activity, it therefore requires individuals who have a high degree of sensitivity to promoting and selling a service or a skill to a client. The client may either be a corporation or an individual deciding to select the ridesharing option. Essentially, ridesharing and ridesharing-related activities performed by staff in these organizations are aimed at altering and changing travel behavior patterns. In addition, the institutional changes highlighted earlier require alteration of existing policies and procedures. These activities, therefore, put a high premium on negotiations, communication, coalition building, and related-skills. It is appropriate to use the term entrepreneurial in describing these people.

As ridesharing agencies are expanding in size and scope, there is a greater need to find people with a broader understanding of management skills. They are needed not only to help run a ridesharing organization but also to help in establishing the strategic approach that must be used in all transportation activity so that objectives can be established, appropriate interventions planned, and progress effectively monitored. As in the case of people with other skills, these individuals should also have an entrepreneurial spirit.

This leads to the obvious concern of selecting and training of staff. It appears that up to now this has not been done with any rigorous criteria. In many instances, the process has been self-selecting in that individuals with a strong sense of mission about the values of ridesharing and a willingness to be advocates for these services have been selected to run or participate in a ridesharing program. While this may provide a spirited individual, it is no guarantee that the person will have other related skills necessary for a successful program.

More recently, transportation planners have become a source for staff of ridesharing agencies and with these planners come a variety of approaches to ridesharing programs. They have often lacked expertise either in managing a program or in selling or persuading individuals about a service or a product. Another area from which staff has emerged is from fields related to marketing and, while they have relevant skills, they lack a broader understanding of transportation issues. In addition, people with special technical skills in the areas of computer or vehicle equipment management have also been ready candidates for ridesharing agencies. The decline of new highway construction has led to the drafting of staff from engineering and right-of-way acquisition areas into ridesharing.

Because ridesharing as an organizational function is in its infancy, it is difficult to profile the most-effective kind of staff and training for the staff. It is clear, however, that we have moved beyond the stage where the single-minded advocacy approach or a view that anyone with a nodding acquaintance with transportation is satisfactory.

While there is a clear need to identify and categorize the kinds of staff and to develop recruiting and selecting a program, there is an equal need to develop training programs for them. Here again it appears that there is a variety of existing programs. In smaller organizations, it appears to be done primarily through learning by doing and a hands-on experience. Bigger ridesharing programs have begun to develop staff manuals and put together limited training to help individuals understand the broader aspects of the program. By and large, there appears to be a notable lack of effective training programs.

To remedy the situation and in part to facilitate training, the Federal Highway Administration is supporting numerous workshops. A brief review of these programs indicates that they are often necessarily cursory in nature and give recipients only a brief introduction to ridesharing. Equally important, these and other training programs have focused on specific technical requirements for providing ridesharing services. As ridesharing agencies expand the scope of their program, content material will need to be broadened to include larger transportation public policy-related issues, a more intensive understanding of each of the service functions, and management training.

Lastly, given the important emphasis on selling, it may be advisable to develop training programs that assist in developing individual entrepreneurial skills. These would include programs to communication, negotiation, deal making, conflict management, etc. Clearly, the extent to which a ridesharing service representative is an effective communicator, his or her effectiveness in promoting ridesharing will be enhanced.

In addition, however, a great deal of research has yet to be done in the private sector with regard to organization development. This field focuses on techniques for improving organizational effectiveness through mobilizing its human resources and encompasses techniques such as goal setting, development of new organizational forms, better communication systems, enhancement of collaborative efforts, etc. Undoubtedly, this area of organizational development is rich in terms of necessary research
for ridesharing since present approaches are haphazard and without much documentation as to their effectiveness.

RIDESHARING AND TRANSIT

We concur with the approach of the National Ridesharing Task Force, which considered conventional transit to be one of a number of ridesharing modes, i.e., alternatives to the single-occupant vehicle. As such, management issues that relate to transit have been implicitly considered in this paper. However, the importance of better integration between transit and ridesharing and the difficulties experienced in this undertaking so far oblige a more explicit consideration of the issues.

Public transit agencies across the country find themselves beset with difficulties. Financial problems plague the large majority of transit systems, with two transit systems having already ceased operations early this year. Faced with the need to cut back on services, transit agencies run up against a series of goals that tend to make cost reductions difficult. Energy conservation, air-pollution reduction, and congestion reduction depend on decreases in VMT. VMT reductions, in turn, depend on attracting so-called choice riders out of single-occupant vehicles and into transit. Yet the financial difficulties caused by extending routes to suburban areas to serve these commuters are increasingly recognized as contributing substantially to transit deficit problems. "Fair sharism", i.e., the necessity to serve all parts of a transit district in order to justify financial support, has also been responsible for long trips and expensive services and has impeded the ability of management to cut unproductive routes.

The provision of ridesharing services directly by transit agencies, or at least the cooperation with ridesharing to serve these less-productive routes, could be of significant benefit to transit. First, it allows transit to operate in a more cost-effective manner. Second, it allows transit to expand its constituency beyond the downtown employers and merchants who tend to be the greatest beneficiaries of transit services as presently constituted.

The management-organization issues involved in improving transit-paratransit integration are complex. Interface points include planning, transit service expansion or cutbacks with possible ridesharing substitution in mind, joint marketing of transit and ridesharing services as alternatives to the single-occupant vehicle, provision of complementary services by transit and ridesharing, effective use of private-sector involvement by both programs to build a constituency for energy-efficient and cost-effective transportation systems, construction of facilities such as park-and-ride lots and high-occupancy-vehicle preferential treatments to benefit both programs, and joint advocacy by transit and ridesharing of policy changes in pricing, parking management, zoning, and other areas to reinforce these modes and provide a disincentive to single-occupant vehicle use. This is just a preliminary list of the many areas in which transit and ridesharing need to improve the coordination of their efforts. Investigation of the effects of joint operation of ridesharing programs and transit by one agency is a promising research topic.

One caveat is important to note here, however. Ridesharing agencies have begun to use a private-public partnership approach more effectively in recent years. Few transit systems have taken this approach. It is important that, as efforts are undertaken to improve transit and ridesharing coordination, this public-private flavor is not lost but extended to transit systems as well.

CONCLUSION

It was the original premise of this paper that ridesharing is essentially a set of management and organizational strategies to increase the productivity of our transportation system. It is hoped that the presentation has described in some detail a variety of service options and functions that a ridesharing agency can provide and the ways in which these can be organized both internally and externally in order to meet this objective of increased efficiency. It is expected that this outline could be used in several ways: first, as a framework in order to establish a set of priorities for further research; and, second, to offer a kind of decision matrix that could be used by individuals who are considering starting or expanding a ridesharing organization.

Up to this point, many of these strategies have evolved in what might be termed a random process in order to meet local needs and conditions. No doubt this has provided us with a vital and dynamic set of opportunities; however, perhaps it is time to consider a more-systematic approach both to provide services and to conduct research on these services.

If it is true that ridesharing represents the leading edge of a set of TSM strategies, then it seems appropriate that the choices inherent in ridesharing management and organization be clarified, that these strategies be diffused among other major transportation planning and operating sectors, that the results of past activities as well as future initiatives be clearly documented and researched, and that this information be presented in as clear and comprehensive a way as possible.
Ridesharing Operations

Richard H. Ribner

EARLY RIDESHARING OPERATIONS (TO THE 1970s)

Not since World War II has there been such a high degree of interest in ridesharing. Although there are many dramatic differences between today's situation and that of World War II, both share one element of crisis—a critical shortage of petroleum products.

In the last months of 1973 and the early part of 1974, the United States faced its first peace-time energy crisis. It caused serious disruptions, including escalated fuel prices and fuel supply shortages, stemming in part from the embargo imposed by Arab countries on oil shipments. The 1973-1974 crisis was viewed by many as a symptom of graver, long-term problems relating to the rapid growth in consumption of the world's limited petroleum resources.

Although ridesharing has existed for many years on an informal level, transportation officials have failed to recognize its importance. Many locales have initiated carpool, buspool, vanpool, and other ridesharing programs in a piecemeal fashion. Programs have been viewed as short-term emergency measures that were implemented by appealing for voluntary action by concerned citizens. This myopic approach makes two errors:

1. Ridesharing is an emergency measure. As soon as the proper technology develops, we can forget about ridesharing.
2. Since ridesharing is an informal process, no external programs can increase vehicle occupancy. People have to want to change their life-styles themselves. It is basically the old problem of human motivation.

Since World War I, travel in American cities has been characterized by declining transit use and increasing reliance on automobile ownership and use. Associated with the shift to the automobile has been a decline in the density of development. Densities of residential development in the more-established parts of the cities have declined due to annexation and the creation of vacant or open land. Likewise, newly established suburban communities on the urban fringe have developed at substantially lower densities than those of the city.

These trends can be explained by the historical patterns of urban growth. For example, in Milwaukee, pre-World War I housing tracts were developed at densities of 17 000-25 000 persons/mile². In the 1920s and 1930s, there was a shift of preference away from apartments and duplexes and toward modest 1- and 1.5-story homes. The density of development was reduced to 12 000-15 000 persons/mile² or less. Finally, the homes of today, many with the need to accommodate a septic tank, are being developed in subdivisions at 4000 persons/mile². Thus, evolving life-styles have created new factors that must be considered in transportation decisions.

It is essential that ridesharing already is a widely used mode of travel and that the potential impact of increased ridesharing is significant. Nationally, 60 percent of all person miles of work-trip travel is by automobile drivers, whereas 10 percent is by public transit riders. Consequently, a 10 percent increase in commuter automobile occupancy would reduce vehicle miles traveled by as much as a 60 percent increase in transit ridership.

Today, intercity buses carry less than 2 percent of the intercity trips; transit carries no more than 3-5 percent of the trips in urban areas except in a few large cities built prior to 1920. Before 1920, the development of rail transportation systems—railroads, trolley cars, and subways—was stressed. After 1920, emphasis shifted to the construction of highways and the use of the automobile to meet personal transportation needs. Legislation was passed to restrict private vehicles from hauling passengers for compensation in order to protect the existing public transportation systems. Carpoools were generally allowed as long as they remained small. Under this transportation policy, virtually all passenger have shifted to private vehicles.

Attention is being focused on more-efficient use of the existing transportation facilities and vehicles because of the concurrent decline of for-hire transportation systems, rise in fuel prices, the near completion of the Interstate highway system, increased societal resistance to new highways and other construction, pollution, congestion, and rapidly increasing costs of building and operating public transit systems. New forms of transportation are essential to meet the need of a society that has drastically changed its life-styles during the last half century.

Organizational Approach

Ridesharing has long been regarded as an underused travel mode with significant potential for reducing fuel consumption and traffic congestion as well as improving air quality. Normally associated with home-to-work commuting in private automobiles, carpooling is an already widely accepted activity and by no means a new transportation mode. Approximately half of this country's 278 urban areas had organized carpool programs in 1973. Many employers, both private and public, have actively encouraged employees to carpool. These programs had been pursued for a variety of reasons, including improvement of traffic congestion and air quality, provision of mobility to individuals who have no alternative form of transportation, and compensation for a loss of available parking space or the reduction of existing parking space (when parking lots have been converted into construction sites). To meet the challenge of energy conservation, organized carpooling was used intensively during the 1973-1974 energy crisis with many such programs supported by funds available through the Federal Highway Administration under the 1974 Emergency Highway Energy Conservation Act.

The number of people now carpooling is similarly sizable, depending on the specific metropolitan area and geographic distribution of home and work locations within it. Private automobiles on work trips generally have occupancies in the range of 1.2 to 1.4 persons/car. At the lower occupancy level, although only 13 percent of the cars carry two or more persons, more than 25 percent of the people are sharing rides. By contrast, mass transit carries only 10 percent of national urban area work trips.

Ridesharing is not associated exclusively with the home-to-work trip and the private automobile.
It should be defined within a broader concept, including other trip purposes (shopping, personal business, social, or recreational) and other vehicle types (10-, 12-, or 15-passenger vans, for example). The objectives of strategies that encourage ridesharing are to add to the group of people who are already sharing vehicles. While one might assume that increasing ridesharing would rather substantially decrease daily vehicle miles of travel (VMT), such large relative changes through increased ridesharing (a) may not be possible without severe intrusions on an individual's mobility; (b) are highly unlikely, since home-to-work travel generally accounts for less than 40 percent of a typical household's daily VMT; and (c) are not necessary to accomplish meaningful energy conservation. However, even a 5 percent reduction in urban automobile fuel consumption, if effective nationwide, would yield a daily saving of approximately 230,000 bbl of oil.

Prior to 1973-1974, organized carpooling activity in the United States was minimal. Most activity that did exist was private-sector-oriented and employment-center-based for some reason other than energy conservation. Even the employer efforts that did exist were designed to assist the ridesharing (primarily carpooling) that was already taking place informally. For the most part, the efforts were voluntary and passive with one exception. World War II: First Major Public Effort

A gasoline-rationing system was imposed in the United States during World War II to sharply curtail civilian use of motor fuel and tires. For over a year, the Petroleum Administration for War (PAW) tried to convince consumers, suppliers, and retailers to cut gasoline use by one-third through voluntary compliance. Little success was achieved and gasoline rationing was put into effect in late 1942. The rationing system suffered from many problems and abuses, such as over-issuance of coupons, black markets, and counterfeiting, but on the whole it was effective. The effect on highway travel was dramatic; VMT were reduced from 300 billion in 1941 to about 200 billion in 1943 and 1944, a decrease of one-third.

Other measures taken to reduce fuel and rubber consumption were a speed limit of 35 miles/h, a highly unpopular ban on pleasure driving, which was later rescinded. One effect of the gasoline shortage and rationing system was that voluntary carpooling was widely promoted by many public and private organizations, including several agencies of the federal government, automobile clubs, countless employers, women's clubs, the American Legion, neighborhood groups, etc.

The American Legion and the Auto Club of New York provided carpool matching services, as did many companies, for their own employees. The Briggs Manufacturing Company, for example, set up a simple, grid-square matching technique in which workers residing in the same grid square met at a designated location in the plant and formed carpools face to face. Companies voluntarily provided a variety of incentives to carpoolers, including supplemental gasoline coupons, tire allocations, permits for recaps, preferential parking of various types, lapel buttons, windshield stickers for recognition, and special insurance coverage for carpools. In an attempt to increase carpooling, the U.S. Department of War in 1942 issued requirements to companies engaged in war production that stipulated the company should make a transportation survey of employees, submit a plan for carpooling encouragement programs, and encourage the use of public transportation. Companies objected quite strensely to the mandatory aspects of the program because of the extra clerical labor needed to comply. Although Washington ended up not deeply involved, large numbers of companies pursued their own programs quite successfully.

A study by the Highway Traffic Advisory Committee found (based on spot checks) that car occupancy increased from 2.0 persons/car in July 1942 to 2.44 in December 1942 and 2.66 in March 1943. Another study of 48 war plants throughout the United States revealed an average commuter occupancy of 2.86 persons/car. Considerable regional differences were noted, as were large variations from one plant to another. Work trips were found to be using carpools to a much greater extent than trips for other purposes. Problems that occurred included falsification or exaggeration of carpool-occupancy levels (by plant managers and individual drivers) and the involvement of too many overlapping organizations in carpool promotion, coordination, and overview.

Finally, it was learned that many people using carpools were motivated as much by the economic benefits of carpooling at a time when the cost of living was rapidly rising as they were by the promotional incentives programs offered. The federal government was also active in promoting carpooling, even to the point of producing a movie in which Hollywood personalities appeared depicting the use and benefits of carpools for work trips.

Early Ridesharing Modes

Buspools

Early ridesharing programs relied heavily on matching and emphasized carpooling; however, buspools and vanpools existed prior to the 1973-1974 energy crisis. Buspools were sponsored by a variety of groups including private bus operators, community groups, employers, employees, and transit authorities. These operations seem to have been a response to unmet transportation demands. Most were created through the efforts of an inspired leader or organizer who became the catalyst to create the service. The circumstances that seem to have been responsible for the formation of these early programs were:

1. Lack of another good transit alternative,
2. Individual commuter initiative, and
3. Availability of excess charter bus capacity.

Early buspool activities have been community-oriented with later programs like those in Knoxville and San Francisco (Golden Gate) organized more as encouragement activities in special situations.

During the early 1970s there was minimal support for and limited knowledge of buspooling activity since it was primarily a community-inspired effort. As a variety of approaches matured and more data on success factors became available, more-organized assistance via ridesharing organizations has been generated.

The 1973-1974 energy crisis focused new attention on the ongoing use of buspooling at a number of locations throughout the country. However, a large-scale proliferation of buspooling has not occurred because of the extraordinary organizational complexity and time needed to start up and maintain a buspool (versus a carpool or vanpool).

Vanpools

Vanpooling, as we know it today, was pioneered by the 3M Company, which in 1973 began a pilot program with six vans and by May of 1974 had 57 vans in
operation. Conex and General Mills, 3M’s neighbors, also began successful vanpool programs prior to the energy crisis as did Irving Paper Mills in Vermont, Hoffman La Roche in New Jersey, Corning Glass in New York, and Allen Voorhees Associates in Washington. These early models were company-owned vanpool programs.

It is quite clear that these early vanpool programs were undertaken for reasons other than energy conservation. Some related to a need for additional building space, others to plant relocations, and many were public-relations-oriented efforts.

Prior to the 1973-1974 energy crisis, the private sector had been more active in organizing carpool and buspool programs than the public sector. A majority of the carpooling activities had been started by employer groups (either individually or collectively) or by private groups such as chambers of commerce. However, not many public agencies involved in carpool promotion gave much attention to vanpooling in 1973-1974. Although many privately owned and operated vanpools already existed at that time, little was known about how they were organized or operated. In addition, as early as 1974, Monarch and Associates of New York had initiated a third-party vanpool program.

**Program Elements**

Prior to the energy shortage of 1973-1974, efforts to encourage the expansion of ridesharing had been pursued primarily by large employers acting independently, by a few state and local transportation agencies operating programs with their own funds, and by various public interest groups concerned with the reduction of automotive air pollutants. The Emergency Highway Energy Conservation Act signed into law on January 2, 1974, provided the first impetus for greatly expanded governmental involvement in the encouragement of expanded ridesharing. Late in 1974, Congress passed the Federal Aid Highway Amendments of 1974, which extended the termination date for approval of carpool demonstration projects until December 1975. Subsequently, federal-aid funding to encourage expanded ridesharing was given further continuity by the Federal-Aid Highway Act of 1976, which deleted the termination date for carpool demonstration projects—in effect granting an indefinite extension for funding of such efforts. The carpool demonstration program authorized under this legislation had the desired effect of contributing to an increased level of organized carpool activities. A total of 106 projects in 34 states and 96 urbanized areas were initiated through 1977. Documentation of these demonstration projects by the Federal Highway Administration provides a substantial portion of the basis for the history of modern ridesharing operations.

Before the onset of the 1973-1974 energy crisis, organized carpooling was not a widespread activity in the United States. The vast majority of carpooling practices was the result of individuals matching themselves up without assistance or externally applied incentives. At this time, the vast majority of formal carpool programs, whether they were formed before or after the energy crisis, was initiated by employers. In many instances, successful programs were motivated by a shortage of parking spaces for employees. Most of these programs matched fellow carpoolers either by hand or through simple computer programs. They usually offered no incentives to carpoolers except, in some cases, preferential parking in the employer’s lot. Virtually all of them were work-oriented. A few programs, however, involved the matching of carpoolers for specialized activities such as ski trips and special events.

These programs were usually initiated without reference to the energy crisis because of other external influences.

Some carpool programs in 1974 were attempting to be more responsive to commuters’ needs and therefore were broadening their services, involving such sponsors as state highway departments, regional planning organizations, and radio and television stations, attempted to match individuals throughout a wide area from a central location by using more complex computer-matching techniques. Many of these programs encouraged major employers in an area to form their own carpools, offering them guidebooks and other materials as aids. Because of their broader base, these programs were promoted through the mass media, by using announcements on radio, television, and advertising or publicity articles in newspapers. Activities initiated in conjunction with these programs were threefold:

1. Public information to inform the commuter of the benefits of carpools and buspools;
2. Establishment of incentives to create parking priorities for carpools and, where feasible, priority lanes; and
3. Ongoing programs to provide matching assistance for new employees.

Early approaches to public information relied heavily on public relations campaigns that stressed the advantages of ridesharing to the individual and society. Energy savings, environmental impacts, convenience, expense, and matching were the primary elements involved in the public relations campaigns. The recognition that ridesharing concepts need to be marketed existed, but early efforts produced inexpensive techniques. Evaluations of several carpool programs indicate that good marketing and advertising, if done effectively, is expensive and that expense was often difficult to justify, particularly in a government budget. Few, if any, early ridesharing projects approached marketing and promotion of ridesharing in the sophisticated manner that one uses to market new consumer products. Project management had little, if any, market research data or demographic information on their potential clients. Incentives, considered part of these ridesharing programs, were limited to special parking privileges for poolers and priority high-occupancy-vehicle lanes for poolers on congested freeways and parkways.

An early Federal Energy Administration analysis of a comprehensive set of ridesharing incentive measures was divided into four categories: (a) travel cost, (b) travel time, (c) convenience, and (d) intangible non-travel-related. Both incentive and disincentive measures to reduce automobile parking, ownership, and operating costs were examined.

Various types of traffic control techniques were considered for application to give priority treatment to high-occupancy vehicles—for example, exclusive separated, reserve, and contraflow freeway lanes; reserve lanes at toll plazas or on surface streets, exclusive freeway ramps; priority metered ramps; and traffic signal controls. The basic motivation associated with priority techniques is to reduce travel time for high-occupancy-vehicle occupants. Typically, priority treatments are in force only during peak periods and thus are applicable primarily to commuter travel.

Convenience incentives increase the attractiveness of ridesharing. There is some overlap between convenience incentives and cost or travel time incentives, since time and cost are often elements of convenience. In general, however, the following incentives appeal most directly to the motorist’s com-
fort in his or her desire to minimize effort related to travel. Incentives considered and developed were preferential parking; park-and-ride facilities; carpool loading areas; shelters; gates at plant entrances; restricted use of highways; special use of bulletin boards for matching; and adjustments to work hours (either by shortening, varying, flexing, or shift-rotation privileges). Other intangible nontravel incentives such as refunds for purchases of goods and services were sometimes used or considered providing incentives in the form of social consciousness and reinforcement.

Many early organizations equated carpooling with computer matching. This blind faith in the computer did not consider that the computer (or manual matching process) only identified pooling candidates, and that actual pool formation was dependent on well-organized, diligent promotion and recognition of pooling. Many early information dissemination on carpooling focused on the matching processes and how match lists should be distributed. A lack of a standardization in approach to carpool matching generated a proliferation of matching software. Early efforts focused on three types of techniques:

1. Passive locator board or pigeonhole technique, in which a potential applicant finds his or her own match at a locator board;
2. Roster technique, which involved the use of a map and color tracks; and
3. Centralized matching technique, in which a supervised questionnaire was distributed and manually matched based on origin and destination codes.

Work-based matching systems were most effective because of the higher concentration of employees at work locations, the employers' involvement in the matching activity, the opportunity to meet your carpool match ahead of time, the scarcity of parking at some work sites, and the opportunity to offer some tangible incentives to carpoolers at the work location.

Formation of carpools frequently involves the processing of large amounts of data. Information about each potential carpooler must be examined, categorized, and assigned to potential carpool groups. Thus, the formation task lends itself to computerized methods when the number of potential poolers is large. Computer methods are usually seriously considered when groups exceed 1000 potential poolers. A considerable number of computer programs have been developed by organizations of all types and used throughout the country to provide carpool matching. These efforts have tended to be independent and uncoordinated. While many of the programs are quite simple and designed for specific applications, many are also designed for multiple uses. These latter programs are written in a generalized format accompanied by user documentation. All of the computer methods in existence require substantial clerical and management efforts—in data collection, preparation, information dissemination, and ongoing system management. Early use of planning and computer-matching programs too often overlooked or underestimated the level of effort required to support such systems.

Both the emphasis and the scope of U.S. transportation activities have changed significantly in recent years. While transportation decision making during the 1950s and early 1960s emphasized major highway construction and long-range master planning, attention now focuses on a more-diverse set of issues and shorter-term objective—increasing the effectiveness of transportation facilities, reducing air and noise pollution, and decreasing energy consumption. As one response to these problems, recent regulations promulgated jointly by the Federal High-
ing to find many urban areas without a strong advocate for implementation of areawide ridesharing projects.

Ideally, ridesharing encouragement programs should be multifaceted, composed of a wide range of actions including not only carpool, vanpool, and buspool matching and promotion, but also varied incentive measures to attract commuters to high-occupancy modes of travel. While most new ridesharing agencies commencing operations today begin with a narrow focus on a specific mode (frequently vanpools), the trend is toward establishing comprehensive programs with employer-based matching and promotion, general public marketing, mass media promotion and advertising, transit information marketing, carpool, vanpool, buspool, and park-and-ride elements.

Brokerage Concept

Ridesharing offers varied benefits. It is especially important to suburban and rural industrial parks, shopping centers, office complexes, and schools in residential areas where densities and trip patterns have made traditional intercity transit services uneconomical and environmentally unfeasible. Ridesharing can also offer economical peak-hour service to supplement transit so that growing transit deficits can be controlled. A successful ridesharing program promises a substantial reduction in fuel use, a significant increase in the passenger capacity of existing highways, and requires little investment by governments.

The brokerage process has quickly become recognized as the most effective approach to the provision of public ridesharing services. The procedure is new to public transportation but is familiar to the business community. Insurance, financial, real estate, and food brokers locate demand, search out potential suppliers, and consummate an agreement. The ridesharing broker coordinates and stimulates an increase in vehicle occupancy in much the same fashion. Brokerage is the process of helping individual commuters find the type of service that meets their needs. The mission of the transportation broker is to match the ridesharing mode (buspool, vanpool, or carpool) with the density-distance pattern that makes it the most cost-effective and acceptable to the individual. With many transportation options available, a brokerage organization cannot limit itself to the use of one type of service or transportation agency. In effect, this would limit its ability to serve only those areas with people able to use the one service offered.

The most effective way to accomplish the broker's goal is to provide a clearinghouse for the information collected by ridesharing programs. By using the existing transportation technology and modern data-processing techniques, the transportation broker can alter transportation services offered to meet the needs of constantly changing communities. Fixed-route, fixed-schedule transit works well where densities are high, employment is concentrated in downtown, or there is extensive non-peak-hour demand for service. However, when the ratio between peak-to-base-period demand increases, efforts should be made to use vehicles that can be driven by part-time drivers who live and work in the same areas as the commuters they transport. Where residential densities decrease and trip patterns become more dispersed, smaller vehicles should be used in order to reduce fuel consumption and operating costs. As trip lengths increase, it becomes more important to garage vehicles in residential areas during the evening to control deadheading mileage if fuel use and costs are to be maintained at reasonable levels.

Ridesharing Program Elements

Promoting ridesharing services to employers, employees, and the public is one of the major functions of modern ridesharing operations. Today's ridesharing organization is generally heavily employer-based in its promotion, although it may have other objectives such as greater efficiency, better matching opportunities, easier personalization of services, and lack of familiarity with home-end matching.

Promotions and Advertising

The techniques typically used to promote ridesharing to commuters are matching surveys, posters, explanatory brochures, form letters, bumper stickers, employee newsletters, information displays, employee workshops, and buttons. More of today's promotional materials are carefully prepared and specifically targeted to well-defined market segments. For example, vanpool presentations might only be given to employees who live more than 15 miles from the work site and have regular work schedules.

Recently published but limited behavioral research (see paper by Margolin and Misch in this section) has added a perspective to the modern ridesharing promotion program. Arguments against it did not previously exist. Nonetheless, even modern ridesharing agencies still only possess a basic understanding of commuter behavior as it relates to ridesharing and its promotion.

The purpose of mass media ridesharing promotion directed to the general public is to reach commuters who are ready to rideshare and to cause them to act, either by phoning the ridesharing agency or by submitting an application by mail. The promotional techniques that have been used to support general public marketing are radio and television spots, newspaper ads and articles, billboards, bumper stickers, leaflets, information displays, mass mailers, highway signs, and special promotions. The purpose of these mass media approaches is to generate dial or mail-in applications for ridesharing service. Knowledge now available to the ridesharing community indicates that attitudinal change should not be an objective of mass media promotion because ridesharing agencies do not have sufficient budgets or technical expertise to mount an effective attitude-changing campaign. These types of campaigns require not only sophisticated media approaches but simultaneous complementary community activities. Most ridesharing organizations have emphasized employer-oriented promotion but have usually spent about 25 percent of their budget on marketing to the public.

Matching

To personalize a service means to tailor it to the customer's individual needs or preferences as contrasted with treating all customers alike. In actual practice this means tailoring program approaches to market segments, e.g., blue-collar workers with suburb-to-suburb commutes while providing only more-occasional assistance specialized for the individual. In addition, personalizing service means to have service mediated by people rather than by impersonal match lists whether computerized or not. Personalization implies some form of active personal outreach to prospective ridesharers. Ridesharing agencies have found low rates of carpool and vanpool formation from simple circulation of match lists to applicants and sometimes high rates of attrition among pools that do form. Increased personal contacts of two types have been tried or considered. Familiarization techniques such as
involvement of carpool or vanpool coordinators in facilitating prompt personal contacts by telephone between prospective ridesharers and follow-up techniques to obtain information on the extent to which the program is meeting commuter needs. Currently, there are insufficient data on these techniques to assess exactly what level of personalization will be cost-effective.

Another major function of the modern ridesharing organization, which was the cornerstone of early ridesharing operations, is the matching services provided to make the brokerage system work. Matching is really a misnomer for data processing. This function is essential to any ridesharing effort. Ridesharing data processing may consist of carpool, vanpool, or buspool matching, transit information, purge procedures, evaluation statistics, and market research and analysis, among others.

The basic steps in the data-processing operation of matching are the receipt of applications, their processing, distribution, and follow-up. Ridesharing agencies may choose today from a variety of available matching techniques. Choice may be determined by the size of the data base, number of transactions that take place, number of functions to be performed on the data, availability of computer support, and the budget that may exist. All processes, whether manual or automated, require geographic coding for the purposes of matching applicants with similar origins and destinations. Today's choice of data-processing techniques includes manual, automated batch, and interactive instant matching technique. Few programs have employed the state-of-the-art interactive instant matching technique because of its cost and complexity of implementation. However, one system does exist at RIDES in San Francisco, which appears to be operating quite effectively.

Ridesharing applications may be received by a dial-in procedure on the telephone, by mail, or through an employer-company liaison. Many ridesharing agencies have found the dissemination of information on the use of public transit to be an effective element to be integrated into the ridesharing program. Although only a few projects have employed transit information as a major marketing element, a large percentage of projects does include some level of transit information.

Incentives

A potentially effective, but so far, less-used element of ridesharing programs is the application of various types of incentives to increase the relative attractiveness of ridesharing modes. Only a handful of urban areas have made measurable progress in the implementation of employer-sponsored incentives such as preferential parking, carpool mileage or parking subsidies, and flexible work-hour arrangements. Incentives applied to locations such as highway facilities (for high-occupancy vehicles), differential tolls, public-parking management strategies (to discourage all-day commuter parking), tax incentives for employers or individual ridesharing commuters, and third-party vanpool services have also been slow in developing.

VANPOOLS

Early Vanpool Programs

Since 1973, and often following 3M's example, hundreds of employers have sponsored vanpool programs. Two other major approaches to vanpool operations also exist: (a) the third-party concept, where vans are provided and vans pooled organized by a broker or some agent other than the employer; and (b) the individually owned and operated approach in which an individual commuter provides the van and organizes the vanpool.

Although the initial reason for beginning the 3M program related to parking, the energy crisis of 1973-1974 convinced many Americans that changes in their commuting habits would soon be necessary. Long lines and higher prices at fuel pumps caused many commuters to look for an alternative to the private automobile. Commuter vanpooling was one of those ridesharing alternatives. Through vanpooling, commuters reduce energy consumption and save themselves money by pooling their commuting costs. A vanpool is comprised of a group of employees with geographically clustered residences who share the expense of owning and operating the van in which they commute to and from work. The van usually carries between 8 and 15 person, one of whom serves as a volunteer driver.

Since early 1973, when the first commuter vanpool program began operation, many changes have occurred in the transportation habits of America. Higher fuel prices, more fuel-efficient automobiles, and the increasing popularity of carpooling are reminders of the continuing energy problem. Vanpooling has also shown increased popularity in the past eight years. More and more people are becoming aware of vanpooling through legislative and promotional efforts in the public and private sectors. Companies in every area of the country were already sponsoring vanpool programs by 1974.

Early employer programs had many similarities. Many of them mimicked the 3M success formula. These programs began with a few vans in a pilot program in carefully selected areas. During the initial pilot period, riders and drivers were very carefully screened. Driver selection was so important because of the potential for injury to many employees using the service and the key role they played in the success of individual pools. Program development was hands-on in approach, learning from users' feedback and program experience as they went along. Since these programs started relatively small, matching was generally unsophisticated, although electronic data processing was used. The pilot programs were designed to determine if vanpooling would work at a particular site, how much would it cost to operate, if users would be attracted in sufficient numbers to
make it work, and whether or not the income from the users would be sufficient to cover expenses. Frequently, employee transportation data were pre-
amined to determine if a vanpool program might be more successful, although often areas that exhibited slightly different trip characteristics were chosen in the pilot stages. Many early programs endeavored to expand slowly in order to keep the supply of vanpool vehicles below the demand for service to ensure program success.

Most early company-sponsored vanpool programs, i.e., 3M, TVA, Conoco, and Aerospace Corporation, were initiated at sites where fleet maintenance facilities for other company vehicles already existed. This allowed maintenance work to be done in-house in a substantial number of these programs. In addition, many sites also maintained on-site fuel depots where vans were fueled (often at reduced costs).

These early vanpool programs projected 48-month vehicle longevity. The programs were designed to recover all fixed and operational costs with eight or nine paying passengers. Some programs gave the additional incentive to the drivers through twenty-two dollars a month for other-than-essential vehicle service at company-run facilities. These subsidies are less than obvious to the drivers as an incentive for his or her duties as driver-coordinator of the pool. Most of the company programs conservatively depreciated their vehicles.

The staffing of these early company-sponsored vanpool programs varied widely, depending on what area of the company initiated the program. In some cases, as at 3M, it was the engineering department; in others, the personnel or fleet management department; or a committee with representation from many departments. In most cases, the staff involved in designing the pilot programs were not transportation specialists nor were they employees whose primary responsibility was employee transportation. One thing shared by the early program initiators was that their pilot programs were one-person operations. Later the number of staff committed to most ongoing programs did not exceed the single initiator, with clerical support.

3M estimates that 5 months of paraprofessional, 3.6 months of middle management, 1 month of special services (lawyer, insurance, and finance), and 0.50 month of top-management support were required to implement its vanpool program. Conoco, on the other hand, estimates that it expended only 0.25 month of middle-management effort, but almost 10.25 months of special-service support in order to implement its program. In 1978, with 80 vans operating, the ongoing staffing for 3M's program required 6 months of middle-management and 1.5 months of clerical support. TVA, operator of the largest vanpool program in the United States (500+ vans), needed the equivalent of 5.5 full-time persons to maintain its program (which may include other modal responsibilities).

Most early company-sponsored vanpool programs provided direct subsidy for their programs through absorption of the administrative costs necessary to set up and continue operation of their programs. In addition, many of these company programs provided back-up vehicles, gasoline at company pumps, insurance (through the corporate fleet policy), and essential vehicle service at company-run facilities (often below private-sector cost), which indirectly subsidized operation of the vans. In addition, some of these vans were used for other-than-commute purposes and the income from this use was credited to the vanpool operation providing another avenue for subsidy. Other company programs provide allowances for limited periods of time in order to allow vanpoolers to attain successful ridership levels. These subsidies are less than obvious to the casual eye and continue to exist as a form of corporate support for vanpooling.

Public-Sector Involvement

The genesis of public organizational involvement in vanpooling was a response to the spectacular growth and success of 3M and other early corporate vanpool programs. The public sector did not actively become involved in vanpooling until 1975. Local third-party operators, both for profit and not for profit emerged about this time. Establishing a third-party program was more difficult than an employer-sponsored program. They were specifically developed in response to the disappointing growth rate of commuter vanpooling in the company-based arrangement. Because the burden and/or fear of liability was thought to be the reason for much reticence to initiate company programs, third-party organizations in their initial phase were created specifically to remove these apprehensions.

In order to accelerate the viability of vanpooling in some urban areas, public organizations began to coordinate those elements required to negate the existing impediments. The now common third-party vanpool organization was born of necessity in California as Commuter Computer and in Massachusetts as MassPool. Later, second-generation organizations sprang up for the same purpose in San Francisco (RIDERS) and in Baltimore (Vango). Most recently, third-generation programs such as the Greater Hartford Ridesharing Corporation, Metropool, have been established. Each had a similar mission: to create an organizational arrangement for individuals and employers who were unable otherwise to participate in ridesharing or vanpools. The third-party lessor functions as coordinating agent or broker for the vehicle, insurance, and matching required for a successful vanpool operation.

Four UMTA demonstration projects commenced between October 1975 and June 1977. These projects in San Francisco, Minneapolis, Knoxville, and Norfolk were each unique among vanpooling programs because each involved a third-party organization (as distinct from the more common employer-sponsored programs) and as such provided vanpool service to multiple employment locations. The four demonstrations encompassed a variety of organizational and operational approaches to the third-party multiple-employer concept. Major areas of difference in these projects were the role of operating third-party organizations (each with a different geographic target and focus group), one (the Minneapolis project) involved three suburban multiemployer work sites, one (the San Francisco project) was corridor-oriented, while another (Knoxville) was areawide in scope.

Each of the four projects employed a variety of techniques for promoting vanpooling, which were generally tailored to local conditions and project operational characteristics. Other project differences related to van acquisition and leasing arrangements, fare schedules, vehicle specification, and success of 3M and other early corporate vanpool programs. The public sector did not actively become involved in vanpooling until 1975. Local third-party operators, both for profit and not for profit emerged about this time. Establishing a third-party program was more difficult than an employer-sponsored program. They were specifically developed in response to the disappointing growth rate of commuter vanpooling in the company-based arrangement. Because the burden and/or fear of liability was thought to be the reason for much reticence to initiate company programs, third-party organizations in their initial phase were created specifically to remove these apprehensions.

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sector free of public involvement, it is often praised as transportation that pays for itself. There are in fact, few (if any) public or private programs that "pay for themselves." Considerable staff time and other resources are required to promote the concept, match and organize pools, and manage an ongoing program. In a company-based program, the entire vanpool program, including acquiring vehicles, obtaining insurance, matching/organizing pools, and collecting fares, is handled by company staff. The cost of these efforts, according to many who have organized vanpool programs, has been surprisingly high. Various estimates of the administrative effort involved in maintaining a vanpool program have been reported. Johnson (1977) indicates that the maintenance cost with respect to program size is surprisingly linear—with $200/van/year.

However, assessing the cost of this organizational administrative effort is difficult, since few companies keep records on staff-time expenditures and payrolls are not immediately increased to implement a ridesharing program. Program-initiation cost estimates made by the Tennessee Valley Authority indicate that it cost $10,000 to start its program. Conoco suggests considerably more cost, $41,000, and Commuter Computer indicated a range of $30,000 to $40,000 for the implementation of a company-sponsored program.

When estimating the costs for third-party operations, very few reliable data are available. Third-party operations incur costs in the following administrative areas: (a) costs for organizational start-up (office setup, promotion, etc.), (b) costs for marketing and establishing a certain size vanpool fleet, and (c) costs for maintaining the vanpool fleet at any given size.

Preliminary data from the Golden Gate Project suggest an answer to the important public policy question: How cost-effective are public expenditures for vanpooling compared with those for subsidizing other transportation modes?

For a vanpool formed by the project, the subsidy is a one-time cost for administration plus a seat subsidy during initial operation of the vanpool. Assisted vanpools (pools formed without prior operational experience in Golden Gate van) are subsidized to the extent that they use district administrative facilities, including district marketing expenditures, which could be considered overhead on direct administrative operations.

Subsidies per passenger trip for buses and vanpools are presented in the following table (the reader should be aware that the vanpool figures are less accurate than the bus figures because of uncertainties about cost allocation and because of distortion caused by inflation):

<table>
<thead>
<tr>
<th>Program</th>
<th>Round-Trip Distance</th>
<th>50 miles</th>
<th>100 miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus Transit (based on southbound trips to San Francisco during commute hours)</td>
<td>Cost per passenger trip</td>
<td>2.09 ($ from Marion)</td>
<td>4.23 ($ from Sonoma County)</td>
</tr>
<tr>
<td></td>
<td>Avg fare per trip</td>
<td>1.31</td>
<td>2.08</td>
</tr>
<tr>
<td></td>
<td>Subsidy per passenger trip</td>
<td>0.78</td>
<td>2.15</td>
</tr>
<tr>
<td>Project and Transitioned Vanpools</td>
<td>Fixed and operating costs</td>
<td>Covered by farebox</td>
<td></td>
</tr>
</tbody>
</table>

Nevertheless, these estimates are sufficiently accurate to support the following conclusions:

1. The average subsidy per passenger trip in vanpools formed by the project is initially high; but in the long run, the average subsidy is much lower—just one-fifth (in real terms) of the short-run average subsidy.
2. Subsidies for vanpools formed by the project appear, on the average, to be less cost-effective in the short run than bus transit subsidies but are much more cost-effective in the long run.
3. Even in the short run, subsidies for long-distance vanpools appear to be at least as, if not more, cost-effective than bus transit subsidies for similar distances.
4. Subsidies for assisted vanpools are the most cost-effective.

Vehicle acquisition in the public sector has been of two types—purchase or lease. Early on, Commuter Computer acquired vans (whose lease costs were guaranteed by several Southern California banks). The Golden Gate and Knoxville programs also purchased vans outright (with UMTA funds). After the initial establishment of a third-party leasing arrangement at Vango in Baltimore (in which a minimum contingency guarantee of $30,000 was posted with a private entrepreneur for provision of an unlimited number of vans to be provided by the leasing organization), this concept gained wide acceptance of both private entrepreneurs and public agency sponsors of ridesharing programs and spread across the country. It is my feeling that this development of third-party vanpool leasing was a direct result of Chrysler's involvement with the Twin Cities' UMTA demonstration project. The current (no guarantee) third-party leases have also been duplicated widely. These leased vans are generally provided in a full-fleet maintenance and administration program with the third-party lessee acting as coordinator or marketer of the product. Currently, new entrepreneurs have entered the market selling and leasing customized commute vehicles on the same no-guarantee basis as existing third-party providers.

No attempt has been made to determine the number of individually owned vanpools throughout the nation nor has any technique been developed to do so. However, indications are that they are more numerous than all the vanpools in organized vanpool programs. One group in Washington, D.C., has been operating for more than 10 years. Many others operating to the United Airlines maintenance facility in San Francisco have also been operating many years—prior to the existence of any public-sponsored ridesharing programs. In many respects, they are easier to form than formal vanpools. Insurance is available and financing can be obtained like that for a new car. The major disadvantages...
are that owner-operated vanpools may have difficulty establishing and maintaining ridership due to a lack of viable matching services.

The Golden Gate program in San Francisco has developed a unique third-party approach that focuses on promoting driver-owned and operated vanpools. The Golden Gate program facilitates vanpool formation and maintains project service centers in owner (or leased) and operated vanpools. It also assists in the formation of driver-owned or leased and operated vanpools without prior operational experience in Golden Gate vans. Another unique aspect of the Golden Gate program is the assisted vanpool pack-up plan (less formal than its transition program), and it is designed to allow any existing or potential private vanpoolers in the project service area access to project services.

As van fleets grow in size, fleet maintenance and management have become areas of interest to vanpool program managers. A few fleets now number several hundred vans (200+, RIDES; 500+, Tennessee Valley Authority). With modern technology and the adoption of sophisticated automobile and commercial fleet maintenance-management techniques, there are no limitations to size of a fleet that can be successfully operated by a ridesharing agency—provided that the fleet administration is sufficiently localized and efficiently employs state-of-the-art fleet management technology.

Since most public agencies are operating with leased vans, very few actual fleet management data are available because most lease packages include a complete fleet management service. However, even with a minimal-size fleet, significant coordinating efforts and paperwork monitoring are required by lessees. RIDES recently found it necessary, despite a contracted full-service fleet management program, to hire a staff fleet administrator to coordinate and monitor fleet maintenance activities.

The paucity of analyzable fleet management data available from the lessor brings up the question of a third-party operator’s ability to maintain adequate cost control in the area of fleet maintenance. A major departure from contracting for full-service fleet maintenance was necessitated at the Golden Gate program because of the impossibility of acquiring complete management services suitable to the district’s specifications. In particular, it was thought unwise to place a credit card with the Golden Gate Bridge District’s name in the hands of drivers and back-up drivers in the project. As a result, Golden Gate (which had some staff expertise in fleet management and other assistance from existing district staff) developed its own in-house fleet maintenance-management program.

Service and maintenance procedures for project vans were established in accordance with the manufacturer’s instructions and recommendations. Accounts were set up at local dealerships. Other local facilities were also added to the list of suggested service centers. Drivers were instructed to use personal credit cards for all purchases relating to maintenance, oil, lubrication, minor repairs, and car washes. Receipts for reimbursement for charged purchases were submitted along with the driver’s monthly operating report. Drivers were authorized to pay for service or repairs in amounts up to $30.00 or to charge these repairs at facilities where accounts had been established. When services exceeded $30.00, approval was required from the fleet administrator. In cases of breakdowns or unanticipated emergency situations, where prior approval could not be obtained, driver coordinators were encouraged to use their common sense.

From the outset, the project rigorously attempted to follow a preventive maintenance program adapted from the dealer’s manual. The aggressive preventive maintenance program was designed to (a) ensure van reliability in a program in which vans are rotated through several groups, (b) compensate for minimal driver incentive to pursue preventive maintenance in a program in which several different drivers will drive a given vehicle, and (c) avert major repairs and thus maintain a high level of vehicle supply.

The Golden Gate project determined that, although preventive maintenance increased the overall cost of fleet administration, this added cost was offset by increased safety, reliability, and the ability to preserve a rotating fleet.

To establish the early project operations, one of the duties of a specific staff member was to monitor the fleet administration program and exchange back-up vans for service. The elimination of this position after 18 months severely affected the fleet administration program. A revised servicing policy in which back-up vans were garaged at convenient service centers in Marin and Sonoma Counties was developed. This scheme allowed drivers to switch out vans for servicing without requiring staff assistance.

As the project fleet reached three years of age, the cost of the vans was rising, and the project evidence itself in more frequent incidences of servicing and maintenance. Maintenance costs rose severely despite lower-than-average mileage. The fleet was aging ungracefully and in need of immediate repair. A restorative effort commenced with the acquisition of a Comprehensive Employment Training Act (CETA) employee to once again closely monitor the fleet administration program. Unfortunately, the duration of CETA was limited, and the project has added a permanent fleet administrator’s position to its operation. In addition, the district has responded to staff requests to replace the entire fleet over the next 12 months. Golden Gate’s firsthand experience indicates that careful monitoring and administration of any fleet maintenance program are important in order to prevent major problems as vans reach their twilight period.

BUSPOOLS

The buspool, frequently called a bus club or subscription bus, represents transit service where the riders determine the operating parameters of the service (routes, headways, origins, destinations, and, in some instances, fares). This service is not one that only commuter trips, but it can also be used for shopping and social or cultural trips or any other established purpose on a daily, weekly, or monthly basis. The potential for a premium service at low relative cost is quite high with buspooling since per-passenger cost can be minimized due to higher vehicle capacity. Existing buspools have often been established in response to the desires of a group of potential users. Successful buspools are not new in the realm of urban transportation and can be found in many states from Virginia to California. Buspool or subscription bus service provides fast point-to-point, convenient service with limited pick-up stops and few destination stops. Most of the exemplary buspool programs were in operation well before the 1973-1974 gasoline shortage and the associated revival of interest in ridesharing. Regardless of the organizer, good management that is sensitive to commuter needs is necessary to provide reliably low-cost commuting service that can make this private automobile. Most subscription bus programs operate with older equipment, professional drivers (who are usually paid), provide door-to-door service, with guaranteed seating. Income levels of subscribers
vary from high to low and cost per passenger mile also varies widely. Some subscription bus operations involve deadheading, but a majority do not. Trip lengths average 30 miles or more and load factors generally do not exceed 80 percent.

Evaluation

Evaluation, data management, and analysis in the ridesharing community have been deficient over the past six to eight years. Good evaluation is not a policeman, it is an architect (see paper by Glazer in this section). When the evaluation is intended to find out if a program is a success and, if not, to assess blame on those responsible, it will remain a threatening aspect in program management.

Ridesharing program evaluations should have two purposes: (a) performance evaluation—that is, how many carpools, vanpools, or buspools have been formed, maintained, etc., and (b) policy and strategy evaluation—in which the ridesharing organization asks itself, "What changes should we make to improve our future performance?" Both purposes are valid and necessary. Since ridesharing is new and still developing, the latter requires special attention. Even if ridesharing were not new, social conditions affecting it change, and programs pass from one phase to the next, from one population to another. Strategy evaluation allows an organization to refocus its efforts in response to changing user needs. There is much to be learned about ridesharing, and the continuing evaluation process provides that learning opportunity.

For most ridesharing agencies, information-measuring activities or operating data will be a normal part of the record-keeping function and will typically be reported to funders and other interested parties. In order to provide historical measures of effectiveness, the ridesharing agency will have to perform periodic surveys of commuters. Characteristics of such surveys are designed to measure transportation impacts to be calculated from data obtained through these periodic surveys. In order to accurately measure direct and indirect effects of a ridesharing agency's activities, surveys of applicants, nonapplicants, and the general public are needed. The applicant survey measures the direct effects; the nonapplicant survey measures the indirect effects and changes in ridesharing attitudes and behavior among the general public. The purpose of the general public survey is to assess the climate for ridesharing in order to help judge one's own program efforts.

Very few ridesharing agencies have performed these careful evaluations, and as a consequence, past study results have been seriously questioned. Other survey methodology undertaken by projects' staff have made serious errors and suffered from significant deficiencies. Some of the most frequently occurring faults that affected validity of results include:

1. Sample sizes that are too small,
2. Bias due to low response rates,
3. Samples from too narrow a subset of the population,
4. Extrapolation of sample results to the wrong population,
5. Failure to control for external causes,
6. Inability to discriminate between old and new ridesharers,
7. Failure to consider normal carpool turnover, and
8. Failure to account for dropouts.

Because ridesharing is a new field, and we are operating where conditions change, formative evaluation is an extremely important adjunct to the historical evaluation.

The purpose of formative evaluation is to help develop new policies, practices, and products that will improve future ridesharing efforts. If a ridesharing agency has personalized or developed a professional orientation toward its public, then it is essential to back this up with a systematic approach to measure user needs, wants, perceptions, and satisfactions. New ridesharing promotional strategies and services can be developed accordingly and they will be more likely to succeed.

The three surveys described earlier for doing historical evaluation are a convenient way to test client awareness by placing questions in these periodic surveys. These surveys can also be used to solicit reactions to new services that an agency may be considering. However, care must be exercised here that a person's words and actions will differ. In-depth studies here must be performed to measure commuter needs and preferences. Some of the ways in which this can be done are through employer interviews, attitudinal surveys of commuters, focus groups, and coordinators' or client service representatives. Many of these techniques are unfamiliar to the typical ridesharing administrator. Much learning will have to take place and outside technical expertise will be desirable.

Staffing

Ridesharing encouragement programs are very labor-intensive efforts, with expenditures for staff salaries by far comprising the largest project budget elements. Since the inception of the FHWA demonstration programs, ridesharing organizations have suffered from continuous understaffing. The local situation in most cases will influence how the staff positions are organized. Most programs have started small and added staff as demand and budget would permit. This generally creates a situation in which the staff is too small to fulfill all essential technical functions and simultaneously devote sufficient time to marketing and follow-up contacts with employers. It has been suggested that a minimum of 5 persons/million population served is not sufficient for an aggressive program (Wagner, 1978). In Knoxville, for example, many part-time persons were employed for accounting, legal, and evaluation assistance because of an available pool of part-time labor from the adjacent University of Tennessee. Similar assistance may be obtained through metropolitan planning organizations.

Staffing constraints on ridesharing agencies mitigated against the development of specialization in the operations. Currently, it is believed that the most-effective ridesharing techniques are personalized methods that require staff in addition to computers to reach clients. The employment of these techniques has increased the average size of ridesharing staffs and spurred the development of specialists within a ridesharing organization. Higher pool-formation rates for carpools and vanpools have been achieved by using these personalization techniques. Minimum comprehensive ridesharing operations require staffing the following functions: management-program direction, operations-administration, client information, pool formation, promotion, marketing-outreach, and clerical support. Until recently, training has been on the job. Last year a series of federally sponsored workshops was undertaken and has been helpful in training new and existing employees working in these emerging areas of specialization. These workshops have been a positive step in the development of ridesharing professionals; however, many ridesharing agencies
cannot afford the luxury of sending line employees to another city for such training. This fact may herald creation of new field-training techniques for professional development.

**Funding**

In order to support the various elements involved in ridesharing operation, adequate funding is essential. Funding provisions to support state and local ridesharing activities have been quite consistent, in retrospect, since 1974. However, lacking the benefit of perfect hindsight, agencies facing programming and budgeting decisions on a year-to-year basis, were much less certain about the continuity of funding status for their ridesharing projects. A substantial element of uncertainty prevails today with respect to state, local, and federal funding provisions for ridesharing programs. Uncertainties have to some extent impeded commitments by state and local agencies to pursue continuing comprehensive ridesharing projects. In addition, there is clearly some substance to the complaints of state and local officials that federal aid provisions have also suffered from a lack of predictable consistency and that these conditions have worked to deter commitments of funding continuity for programs like ridesharing.

**DIRECTIONS**

**Ridesharing Technology Today**

In the past eight years, since the oil embargo of the winter of 1973-1974, almost the entire technology base for ridesharing has been created, primarily as a result of the accelerated private and public emphasis on the need for ridesharing activities. However, the abatement of the energy shortage in 1974 resulted in a broad decline of interest in ridesharing programs. Transportation officials saw no compelling need to expand ridesharing as a means of alleviating critical problems. Jurisdictional and functional fragmentation of responsibility for transportation matters made it more difficult to develop strong advocacy for the commitment to implement comprehensive ridesharing programs. In addition, the lack of strong commitment to continuity of ridesharing programs has been an impediment to the growth of ridesharing programs. Few, if any, early evaluations performed as part of ridesharing projects and programs used statistical design and analysis techniques that were sufficiently rigorous to determine the effects of program activities on travel behavior.

Ridesharing, including vanpooling, is in its infancy, although by 1976, approximately one-half of this country's 278 urbanized areas had organized ridesharing programs. A turning point is occurring with respect to the perception of ridesharing's importance in improved transportation. For a long time, encouragement of ridesharing was considered just an adjunct, not an integral part of the urban transportation complex. Now, an increasing number of transportation planners and policymakers are realizing that ridesharing has always been an extensively used travel mode and successful efforts to stimulate increased ridesharing can have relatively high payoffs compared with many other more-expensive urban transportation improvements. Moreover, the expansion of ridesharing is not just a stopgap measure. The supply of transportation facilities is not likely to keep pace with the growth and transportation demand in the years ahead; consequently, the need to rely on ridesharing as one important approach to effective transportation system management will increase in importance in the future rather than decrease, irrespective of the criticality of energy supply.

Ridesharing will face new challenges in the 1980s. New cars will undoubtedly become more fuel efficient; however, the current effort to improve fuel economy is little more than a stopgap technology. Improvements in automobile fuel economy may offer a temporary reprieve from the growing petroleum scarcity, but will not provide a permanent solution. According to Roos (1980), "We must do more than just marginally improve fuel efficiency; we must develop cars that have radically greater fuel economy...The 50-mile per gallon car of the future will be a 50-mph extended-performance vehicle intended for commuting and local metropolitan travel. We may, in other words, no longer be able to command an all-purpose car. Instead we may be on the threshold of an era that will require greater specialization in automobiles with a centralized network of lease and rental agencies disbursed throughout a metropolitan area."

Traditionally, we have regarded the automobile as a means of personal transportation to be used exclusively for the satisfaction of the car owner's private mobility needs. The same forces that are pushing us to modify our attitude toward automobile ownership are also forcing us to revise our established notions of automobile use. The idea that a car would serve the collective needs of the public, providing transportation on a shared-occupancy basis, has rarely been entertained. However, this has begun to change. Responding to escalating gasoline prices and public appeals to conserve energy, growing numbers of commuters are willing to share cars for their work trip or to participate in vanpools often organized with the help of employers. Shopping centers, amusement parks, and resort owners are experimenting with private shuttle systems that would serve their facilities in times of acute fuel shortages.

In the future, we are likely to see the concept of ridesharing grow in sophistication. Community-owned and operated fleets of public automobiles and vans may one day provide a variety of public transportation services, which today are seldom available. New techniques and services such as brokered carpooling and ridesharing back-up systems are being considered. Casual ridesharing systems are being promoted. Events in the late 1970s cast a long shadow on the energy outlook for the industrialized world. Whether these developments herald the end of the gasoline-powered automobile era remain uncertain. Given the value of the automobile in the economies of the developed world, it seems likely that a strong effort will be made to salvage "mobility" in the 1980s. This suggests a growing need to divorce the notion of automobile use from automobile ownership. Many questions will have to be answered in order to develop ridesharing technology for the 1980s. Operationally, these are some of the questions that immediately come to mind as being worthy of further discussion and investigation.

**OPERATIONS**

**Personalized Matching**

1. Is the personalized approach to client services the most-effective technique to increase pool formation, and what are the appropriate techniques for different market segments?
   a. What is the best way to provide these services, and what are the benefits?
   b. What are the optimum time parameters for following up an inquiry for service?
c. Does personalization modify the time equation for responding?
d. How can personalized matching be effectively introduced at the worksite?

Client Identification and Servicing

1. What are the screening parameters to determine clients most apt to become successful riders? What are the optimum pool driver and rider profiles? Do they differ in a carpool, vanpool, and buspool situation?
a. What kinds of collateral material are most successful at attracting applicants and explaining services?
b. What elements should the initial follow-up contract consist of?
c. Should everyone receive a matchlist?
d. What level and type of information should be provided on the phone, through the mail, or in person?

2. Is face-to-face matching really productive and logistically possible in many situations?

3. Should standards for carpool, vanpool, and buspool formation be developed?

4. Should productivity measures and standards be established for client services functions? If so, in what areas?

GENERAL OPERATIONS

1. Which pieces of management information are essential for a ridesharing (small versus large, area-wide versus local) operation?
a. Tracking inquiries, file age, gathering and analyzing statistics?
b. Financial maintenance?
c. Pool administration?
d. Recordkeeping?

2. Can pool longevity be extended? If so, how?

3. Are any tools and techniques applicable to all modes? If so, which ones? If not, why?

4. What criteria does a ridesharing broker use in matching suppliers to users? In other words, how does one avoid being accused of favoring one over another?

5. What techniques are appropriate for updating client information by market?

6. How often should applicant files be updated?

7. What is the effect of outdated client information on user response and agency credibility?

8. Should we use emergency interest as a technique to build an applicant file?

9. What are the issues surrounding payment of vanpool or buspool fares on a monthly or weekly basis or by payroll deduction?

10. When should carpools be upgraded to vanpools, if ever?

VANPOOL OPERATIONS

1. Given the different forms of ridesharing operations, what are the impacts (on staffing and program costs) of contracting out fleet management and maintenance?

2. How does in-house versus contracted fleet management and maintenance impact program accounting and user costs?

3. Does promotion of the owner-operator concept provide a viable alternative to third-party lease program and extensive fleet maintenance and management responsibilities?

4. Is ridesharing fleet management-maintenance using state-of-the-art techniques?

5. How can we overcome the problems that occur when contracting for fleet maintenance or management?

6. What is the appropriate depreciation period in residual value relative to acquisition of vanpool vehicles?

7. How do we deal with availability problems in obtaining ridesharing vehicles? Is vehicle availability a real problem? How can we best manage it?

8. Should we attempt to provide back-up vans to vanpoolers? If so, what mechanism should we use?
a. What number of vans should we have in relation to the number of vehicles in an operating fleet?
b. How should back-up vans be financed?

9. Is there a market for luxury or customized commuter vans? If so, should we pursue it?

10. What are the pros and cons related to the dry vanpool fare?

11. Do radial tires for vanpools make good economic sense?

12. What are the trade-offs in using 15- versus 12-passenger vans?

13. What are the best bookkeeping and accounting methods for keeping track of vanpool operations (manual versus computerized)?

BUSPOOL OPERATIONS

1. Should buspool operations be subsidized? If so, at what level or under what circumstances?

2. How should private charter bus operations be integrated with public bus operations?

3. When should groups of vanpools be upgraded to buspools?

4. What are the costs associated with buspool operation?

5. What is the most appropriate approach for a public ridesharing agency to take in promoting buspool operations?

Private-Sector Ridesharing Operations

James Lowe

Ridesharing in the private sector has had a long history. It includes carpooling, vanpooling, and subscription buses. No matter which of the methods used or promoted by a private employer, their success depends on management commitment to follow through. This paper discusses why the operators of private-employer ridesharing programs need to reflect the management "style" of the sponsoring firm and poses several questions regarding operating scenarios.
BASIS FOR INVOLVEMENT

It has been a practice in industry that it is the employee's responsibility to get to work. This principle has been supported by Internal Revenue Service rulings and has been an integral part of commutation over the years. Unresolved issues have limited private-employer involvement in ridesharing. For example, Must the employer advocating ridesharing pay overtime for the commute trip? Is the employer responsible for travel accident insurance and worker's compensation during commutation? Or what is the company's liability if employees of more than one company rideshare together? Many of these questions have been addressed by the Model State Law to Remove Legal Impediments to Ridesharing Arrangements, which was developed by the National Committee on Uniform Traffic Laws and Ordinances. The model law has the support of the National Conference of State Legislatures, but unless it is enacted by all of the states, many of these barriers will remain for the private employer. Without resolution, many important carpools have always existed. In fact, it is traditionally believed that between 15 and 20 percent of employees rideshare without employer incentive or promotional activity. This is confirmed by the experience at IBM that shows, prior to its nationwide carpool camapigns in 1979, that slightly more than 20 percent of the employee population was participating in some form of ridesharing (carpooling, subscription buses, public transportation, or vanpools).

COMMITMENT OF CORPORATE RESOURCES

It is interesting to note that when there is a business reason for the employer to get involved with ridesharing, many social and institutional barriers can and are eliminated. Basically a business reason is anything that will affect production, expansion, or the cost of doing business and results in a profit or loss to the bottom line of a corporate financial statement. A few examples of company involvement in ridesharing follow.

During the 1920s and 1930s, Reader's Digest was just starting in a suburb about 50 miles north of New York City that was served by very limited public transportation. In order to attract employees, the company found it necessary to start a charter bus service throughout the surrounding communities. It did this by chartering buses in the communities at a cost of 20 cents/ride to the employee. Although the ridesharing program began with chartered buses (and the program is still costing only 20 cents per employee per ride), it has expanded its program to include carpooling and vanpooling.

Land use also becomes a key factor in employees' involvement in ridesharing. In the 1970s, both Hallmark Cards and the 3M Company found that providing parking for their employees was causing employee inconvenience, increasing congestion, and limiting the company's ability to expand on site. Through ridesharing, both were able to reduce the parking space required, reduce congestion, and make more effective use of land for facility expansion.

Unlike Reader's Digest, which started its headquarters operations in the suburbs many corporations today are moving from major metropolitan areas, like New York City, to less-congested rural areas. In doing this, they are creating several problems. First, they are moving away from major transit systems. Second, they are moving away from population centers that may have the type of skills needed to meet their requirements. Third, there may be several employees who are valuable members of the company who may not wish to relocate. Again, ridesharing becomes a major tool that management turns to in order to solve some of these problems. This may be in the form of carpooling, vanpooling, or subscription buses.

RETURN ON INVESTMENT

Getting management support to fund ridesharing in the private sector can be a major task. Most companies are interested in activities that will help improve the bottom line, increase sales, or increase productivity. Funds that will help meet these types of objectives are obtained through an analysis that shows how dollar returns or quantifiable benefits to the corporation for each dollar expended. It may be difficult to always find hard dollars to support ridesharing in today's business environment.

The next step then is to look at other less tangible areas that benefit the corporation—for example, getting people to and from work when you have moved to the suburbs, preventing a congesting problem, reducing tardiness and absenteeism, improving employee morale, and encouraging conservation. The degree to which each of these reasons is important to top management will determine the success, the resources, the incentives, and the power that the ridesharing organization has. Strong commitment and interest lead to strong programs. Conversely, marginal interest leads to marginal returns. There are numerous examples of what can be done to resolve business and transportation problems when management commitment exists such as in the case of Reader's Digest. At IBM, a sense of social responsibility was the primary motivation for creating a nationwide carpool campaign. Often, however, there will be a combination of reasons, as in the Hallmark Cards and 3M programs where social responsibility, conservation, parking, and land use were involved.

The employer that gets into ridesharing has to come to grips with many of the areas outlined here. These employers might use the checklist that follows:

1. Do we have a parking or land use problem? Yes or no? If yes, how serious is that parking problem and what is the cost of the business' decision to get into or deepen commitments to ridesharing?
2. Do we have a problem attracting quality people to our facility because of lack of public transportation or of moving from a major metropolitan area to a rural area? (The problem may also be getting people from a rural area to the metropolitan area.) If yes, consider the pros and cons of what a ridesharing program can do to help solve the problem.
3. Does the corporation have a responsibility to promote the conservation of energy within the organization by communicating to employees energy saving tips to be used at home, in the office, on business trips, and in commutation? The simple task of turning off lights at home or in the office, reducing the temperature, or sharing a ride during a business trip or while commuting will produce a savings for the corporation and the employee. If yes, begin to develop a ridesharing strategy. If no, why not?

MATCHING PROGRAM OPERATIONS TO COMPANY STYLE AND NEEDS

In answering yes to any one or a combination of the above, you are ready to begin looking at ridesharing program alternatives or combinations of alternatives. Each of the ridesharing approaches—carpooling, vanpooling, and subscription buses—has characteristics that will appeal to a wide range of corporate needs.

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Land use also becomes a key factor in employees' involvement in ridesharing. In the 1970s, both Hallmark Cards and the 3M Company found that providing parking for their employees was causing employee inconvenience, increasing congestion, and limiting the company's ability to expand on site. Through ridesharing, both were able to reduce the parking space required, reduce congestion, and make more effective use of land for facility expansion.

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Carpooling provides a company with the ability to make a contribution to conservation without involvement in vehicle purchases with the knowledge that a majority of the employees can participate. Vanpooling appeals to a smaller base of the population, but it can have considerable impact where land use is a concern. Subscription busing provides a means of pooling more carpools and vanpools together in a bus.

An area that has not been discussed but that is also an important part of ridesharing is mass transit. Employers can work closely with mass transit in developing schedules and routes through the identification of where the employee population lives and the facility's start and stop times.

Design of the ridesharing program mix must also be in accordance with overall company policies. These can be determined by asking the following questions:

1. How firmly do you believe in the principle that it is the employees responsibility to get to work?
2. Do you feel the corporation should subsidize the commutation effort?
3. To what extent and in what form should the subsidy be, if any?
4. Does worker's compensation apply to a company-promoted or company-sponsored ridesharing program? To what forms of ridesharing does it apply?
5. How much insurance should be carried? And by whom, the corporation or the employee?
6. Do overtime wages apply?

In answering these questions, a great deal of the corporation's policies and experience will come into play. For example, a company that has a long-standing practice of providing company-owned vehicles to its employees or of providing customer service or marketing has no doubt developed expertise in negotiating fleet contracts and in establishing its own maintenance organization to service the fleet. The decision concerning the type of ridesharing program it implements might be completely different from that of an organization with no experience in fleet management.

Equity is also a major concern for many employers. Should the corporation provide assistance to a group of employees that is not available to all employees? In the ridesharing environment the question is, Should vanpools be subsidized or should discount mass transit passes be given when these services cannot be used equally by all employees? If equity does not pose a problem, then the ridesharing program established may be different from that of an organization with no experience in fleet management.

The time and management commitment involved in making a ridesharing decision and matching operating policies with the organization are considerable and should not be taken lightly. For example, IBM has achieved a level of almost 40 percent participation in a ridesharing program that has at its core a strong nationwide carpool program and a ridesharing coordinator at every location. This is complemented by active administrative assistance from management and the location coordinators who assist employees interested in vanpooling and subscription busing. Location coordinators have also worked closely with local agencies to provide improved transit service.

The three basic elements of IBM's program are:

1. An organization that has management support to implement a program, market and service a wide range of employees, and get them interested in ridesharing;
2. Resources to make this happen—manpower for coordinators, budget dollars for promotion, programming, and computer time for matching; and
3. Incentives—perhaps preferential parking, staggered work hours, or letting it be known that meetings are not going to start before normal work start time or run beyond stop time.

Ridesharing services are dependent on the reasons and commitment of the employer to provide the resources necessary to meet the corporate and ridesharing objectives they have set.

The future of finalized ridesharing programs will be based on the increased use of ridesharing to solve business problems or exploit business opportunities. Expansion will continue to accompany business growth and as expansion uses land normally devoted to parking, it will make further demands on business to get into ridesharing.

In addition, as the need for attracting both skilled and unskilled employees increases and as employers move to areas where mass transit does not exist or is limited, the private employer will need to increase nontraditional means of site access. As fuel becomes more expensive and its availability less certain, employees will look to companies to provide them with some type of assistance to conserve, while employers will seek to insulate themselves from work disruptions.

PUBLIC ACTIONS TO IMPROVE PUBLIC OPERATIONS

The most obvious public involvement in private ridesharing programs is in the area of legislative and regulatory changes. This can be accomplished in several ways, including the granting of both tax and regulatory incentives to assist business in meeting its ridesharing objectives. For example, many employers are still concerned with worker's compensation, payment of overtime, and public utility regulations relating to intrastate travel where fees are paid such as in a vanpool or subscription busing. Passing legislation or revising regulations to deal with these areas would be quite helpful. Some of the regulatory changes might also expand the number and services of the private ridesharing entrepreneur. Other actions the public sector can take to expand service, such as matching, providing vans, and seeking to reduce business concerns about exposure to liability, will have a positive effect on the success of future ridesharing endeavors.

This is only a brief synopsis of ridesharing. The examples given could have been expanded on, but they are representative of the status of ridesharing in the private sector. This background merely gives a basis for establishing research questions that should be instrumental in helping to increase interest and concerns for ridesharing. Some still not fully answered questions follow:

1. Are there other tangible or intangible reasons that would interest an employer in getting involved in ridesharing that are as persuasive as bottom-line objectives?
2. What are the advantages of a company providing its own in-house ridesharing service rather than having it run by an outside organization?
3. Do these advantages outweigh the benefits of having an outside organization run the ridesharing service?
4. What service can be provided by an outside public organization to assist the private sector?
5. What are the employee-relations concerns of a private-sector organization that wants to get involved with ridesharing?
6. Does ridesharing come under National Labor
Relations Board regulation of wages, hours, and working conditions?
7. Is ridesharing a fringe benefit? Should it be? Is it taxable income?
8. Is there a point at which it is no longer the employee's responsibility to get to work but management's?
9. Where an employer's support for vanpooling may include employees from another organization, are the multiple-employer implications of such an arrangement? Are these concerns, if any, minimized by having a public or nonprofit organization administer the program?
10. Does the ridesharing decision process change depending on the size of the organization? If so, how?
11. Are ridesharing programs cost-effective in terms of budget, ridership, longevity, and should this be the sole rationale for success?
12. What makes a successful carpool? vanpool? subscription bus service? Is it neighbors riding together? Is it being employed by a common employer? Is it the practices and incentives that the employer provides?
13. Why are some pools more successful than others? Why have some informal pools lasted more than 20 years? Why, after a crisis and ridesharing promotion, does there seem to be a decline in ridesharing participation? Once there is some promotional activity, either before or after a crisis, which of the forms of ridesharing has the most permanent effect—carpooling, vanpooling, or subscription buses? Is ridesharing success dependent on matching techniques, such as person-to-person, using a coordinator, providing a listing and having employees make their own contacts, or providing incentives?
14. What is the most successful technique to measure ridesharing success at company work sites and how does that show the effectiveness of a ridesharing system?

Ridesharing Evaluation
Lawrence Jesse Glazer

For most ridesharing agencies (RSAs), evaluation is an afterthought. Most RSAs are established in response to a clearly perceived problem (e.g., a gasoline shortage), and ridesharing is an "obvious" solution. This solution is so obvious that expectations are often wildly optimistic and program evaluation seems unnecessary. Only after the RSA has been in operation for a year or more, and it is seen that the optimistic initial goals will not be met, does evaluation become relevant.

While the roots of organized, large-scale ridesharing promotion can be traced back to World War II, little can be learned from experiences of that era because those efforts were viewed as emergency measures. Consequently, little evaluative work was done at that time.

The oil embargo of 1973-1974 was the primary impetus for the current round of ridesharing efforts, although a few programs were started before the embargo. Many large urban areas and a few small urban areas across the country initiated an areawide ridesharing program (then called carpool programs), and many of these programs persist today. Thus, while some of the programs have undergone substantial changes, most large urban areas have had an areawide ridesharing program in place since the mid-1970s. We will refer to these as the "old-guard" RSAs. The late 1970s, especially 1979, saw the establishment of a "new wave" of RSAs. This new wave is made up largely of RSAs located in small urban or rural areas. The gasoline shortage of 1979 was a contributing factor, but probably a larger impetus to the formation of these new RSAs was the recognition that the energy shortage and its adverse economic impacts represent a real and long-term phenomenon.

Since there were no precedents, many of the old-guard RSAs were created with wildly optimistic goals; for example, "place 25 percent of all commuters into carpools". Although subsequent market research has found that a more realistic first-year goal might be 1 percent or less, most new-wave RSAs do not seem to have access to these research findings, so they too are usually saddled with unrealistic expectations. In most cases, these goals are not explicitly stated, so each player on the local scene carries around a notion of what this goal should be. This lack of a common set of expectations eventually leads to disagreements, because nobody has defined "success" at the outset.

These approaching problems are usually not seen by the new RSA, whose major concern is to get organized and produce some visible results quickly. Whether old-guard or new-wave, the development process of an RSA is similar. It starts with one or several people and then grows in size as required. Most old-guard RSA staffs now number from 8 to 20 people, while most new-wave RSAs will never grow beyond their initial size of one or two persons.

While RSA staffs are new and small, there is often not much specialization of function and rarely will a new RSA explicitly assign one person the responsibility for evaluation work. Compounding the problem, the new-wave staff is coming from increasingly diverse backgrounds (e.g., teaching, sales, administration, etc.), as opposed to the original old-guard staff, most of whom came from transportation planning or engineering backgrounds. These new people generally lack the analytical training and experience needed to foresee and manage the evaluation requirements.

For this variety of reasons, evaluation needs are generally ignored during the first year or so of operation. Evaluation and reporting procedures during the first year generally amount to tracking the growth of the data base. But then the honeymoon abruptly ends, and critics (or supporters) begin to ask, Where are these miracles we have been expecting?, Why has there been no noticeable change in our transportation problems? Such questions will usually be asked by funders during budget-preparation time. This gives rise to the first real evaluation effort at that RSA. The objective of this effort will be to measure past performance in a way that justifies continued funding.
Since the funders do not know much about ridesharing, they will usually leave the evaluation work to the RSA, which chooses the measures of success and the evaluation methodology. Given the varying backgrounds and capabilities of the RSA staffs, these evaluation studies are performed, but often not very well. Certainly, they are not performed with uniformity, as individual RSAs across the country have chosen widely differing measures, suunta; and have used a variety of evaluation methodologies. Like other aspects of ridesharing, it seems that a full appreciation of the complexities of ridesharing evaluation does not develop until after the first evaluation study is performed, if then.

The old-guard RSAs who have gone through several evaluation cycles have learned from their initial mistakes, and the quality of their work is significantly better than that of the newer RSAs. But systematic deficiencies still exist. (These are discussed later.) One major and consistent deficiency is the use of evaluation for purely historical purposes, that is, to measure what has been done in the past. Largely ignored is formative evaluation, whose purpose is to guide the RSA management in the selection of new or modified policies, practices, products, and services. This may be because formative evaluation is not seen as part of the role of an operational agency like an RSA and is not encouraged by funders.

Finally, most of the evaluation findings that have been disseminated to date through forums such as the Transportation Research Board (TRB) have been those of the old-guard RSAs, mostly operating in medium-to-large urban areas and mostly using computerized, passive matching techniques. Indeed, a substantial percentage of the new-wave RSA people have never even heard of TRB or similar information clearinghouses, so they tend to operate in isolation—that is, not learning from others' experiences and not sharing their evaluation findings.

THE CURRENT SITUATION

There are, at present, several hundred RSAs nationwide. They are characterized by great diversity in terms of budgets, staff size and backgrounds, organizational form, size and characteristics of area services and services offered. Great differences exist among RSAs with respect to the resources available for doing evaluation work. There are some common evaluation needs (e.g., the measurement of reduction in vehicle miles of travel (VMT)), but there are also many unique evaluation needs (e.g., measuring the effectiveness of personalized matching services or other specialized services).

To date, evaluation work by RSAs and researchers in the field has produced some useful results. Sound techniques are now available for performing the basic ridesharing evaluation studies (i.e., to measure the direct effects of RSA promotion and matching efforts on those who have applied for this service). Sound techniques are available for calculating program impacts (i.e., changes in VMT, vehicle trips (VT), fuel consumption, air pollution, parking demand, and user costs). There are numerous examples of well-written evaluation reports (i.e., a proper audience orientation). There are also some consistent, yet significant findings, for example, that changes in VMT amount to less than 1 percent of areawide work trip VMT, and that ridesharing is the most cost-effective transportation system management technique for reducing VMT (1). At the same time, there have been and continue to be major deficiencies in the historical evaluation studies by many RSAs (2). Some of these are

1. Inadequate sample sizes for given study objectives;
2. Nonresponse biases, resulting from use of mail-back surveys;
3. Nonrepresentative sampling techniques;
4. Sample extrapolation errors;
5. Failure to control for external influences;
6. Failure to discriminate between old and new carpoolers;
7. Failure to consider normal carpool turnover rates;
8. Failure to account for carpool dropout (or to measure longevity);
9. Failure to account for priority mode of carpoolers; and
10. Failure to measure trip circuitry of carpoolers, home-based and work-based midday travel.

Another consistent omission in most RSA studies is the absence of any formative evaluation, whose purpose is to improve future performance. The main focus of attention is on examining possible changes in policies, practices, and services. The theme can be summarized as increased client awareness, or, more prosaically, know your customers, a concept that is second nature to marketing specialists. The lengthy list of formative evaluation issues includes the following:

1. Satisfaction of applicants with RSA services; if dissatisfied, why?
2. For ridesharers, reasons for ridesharing; likes and dislikes?
3. For nonridesharers, what prevented it?
4. For those who did not apply for RSA services, why not?
5. General recognition of RSA and knowledge of services offered; and
6. Reaction to possible new RSA services.

In summary some RSAs are performing high-quality historical evaluations and others are not. There is a clear need for more uniform study methodologies. Most RSAs are not performing any significant amount of formative evaluation. Development and dissemination of formative evaluation techniques are needed, but these techniques must be appropriate for the wide range of RSA resources available for performing such studies.

FUTURE RESEARCH NEEDS

Many ridesharing research needs are already clear, but they are listed and discussed below, in order of decreasing priority as I see them.

Development of Standardized MOEs

Standardized measures of effectiveness (MOEs) (or performance measures) are sorely needed by RSAs for measuring both the direct RSA effects (persons placed into pools as a direct result of applying for RSA services) and the indirect effects (persons who were induced to rideshare as a result of employer-based or mass-media promotion by the RSA, even though they did not apply for RSA services). For purposes of discussion, MOEs that have been more commonly used can be separated into four categories as follows:

1. RSA activities—Number of employers contacted; number of employers actively surveyed (promotion and matching); number of employees reached; number of applications received; and minutes of television, radio air time, and newspaper column inches obtained;
2. Effectiveness—Number of persons assisted or placed into each ridesharing mode, average duration in each ridesharing mode, and awareness of RSA services;

3. Transportation impacts—Reduction of VMT and VT, reduction of gasoline consumption, reduction of air pollution emissions, and commuter cost savings; and

4. Cost-effectiveness—Cost per person placed (by mode), or cost per poolee-year; cost per VMT reduced, per VT reduced, per gallon of gasoline saved, etc.; and cost per dollar saved by program users (often called cost/benefit).

Of course, this list is not exhaustive. Most RSAs would appreciate guidance about which MOEs are important. Perhaps this is more of an information-dissemination problem than a research problem, but it is a major need.

**Standardized Evaluation Methodologies**

Ideally, these survey methodologies should be cookbook, simple descriptions of what to do. For survey techniques, the standard methodology would include

1. Identification of survey populations,
2. Description of survey techniques,
3. Selection of sample and calculation of sample size,
4. A standard questionnaire form,
5. Training of interviewers and pretesting the questionnaires,
6. Performing and monitoring the surveys, and
7. Analysis of data collected (detailed formulas, statistical programs, etc.).

For small-group and structured-interview techniques (e.g., decision-analysis panels and focus groups), the standard methodology might include

1. Identification of target populations,
2. Selection and recruitment of specific individuals,
3. Procedures for setting up and conducting the sessions or interviews,
4. Analysis and interpretation of findings, and
5. Application of findings to RSA policies and practices.

This item (standard methodologies) is probably the most difficult of the research needs listed here because of the great diversity of resources available to RSAs for performing evaluations. At one extreme, several RSAs have evaluation specialists on staff or available through staff loans. At the other extreme, there are numerous one-person RSAs, and that one person is selected on the basis of management and marketing skills rather than evaluation abilities. I feel that several standardized methodologies are needed, each targeted to a specific level of sophistication and need. And perhaps someone other than the RSA should be performing the evaluations, someone with greater resources and objectivity.

**Guidelines for Transferability of Findings**

A more relevant way of stating this need is, How can one RSA be fairly compared against others? Funders are already asking, What has been accomplished at comparable RSAs elsewhere? New RSAs are now asking, What are reasonable first-year objectives based on the experiences of comparable RSAs?

Of course, this begs the question of what is a "comparable" situation. This requires some careful research into the situational factors that affect the success of an RSA. Of course, no two situations are identical. We need to identify what factors are important and what factors have little or no bearing on RSA success—success now defined in terms of standardized MOEs and evaluation methodologies. Situational factors affecting comparability can be grouped into the following categories:

1. The RSA—Budget, staff size, organization form, services offered, etc.;
2. The market served—Number of commuters, existing level of ridesharing, number of large employers, nature of the area (e.g., rural versus urban, dispersed versus concentrated work sites, etc.), commuter characteristics (trip lengths, incomes, automobile availability, etc.);
3. The macroenvironment—Price and availability of fuel, condition of the local and national economy, local air pollution or traffic congestion or parking problems, transit availability, etc.; and
4. Personalities and institutions—Personalities of key RSA staff and/or supporters, the local institutional setting (cooperating or competing public or private entities), regulatory constraints, etc.

Once it is clearly understood how these myriad factors affect the success of an RSA, then it will be relatively easy to develop performance standards for each RSA and to identify expected levels of accomplishment. This would be of great value to both RSA funders and the RSA staff as well.

From the point of view of both the funder and the RSA, a more important transferability issue is, How can the evaluation findings be used to compare the RSA with other transportation programs competing for local funds? Rational allocation of increasingly limited resources requires this type of comparison (in which ridesharing usually emerges very favorably), but such comparisons are rarely done. Research is needed to develop guidelines for comparing ridesharing programs with other transportation programs.

**Techniques for Evaluating Program Components**

A common need voiced by many RSA staff people is, How do I know if this particular part of my program is worthwhile? Such questions have been raised concerning mass-media marketing, employer-based marketing, new activities such as personalized matching or neighborhood-based coordinators, etc.

From the perspective of RSA management, these are critical needs. Assembling a ridesharing program nowadays is based mostly on tradition and educated guesswork. RSA decision makers are often asking about major components, such as mass-media marketing, but sometimes also carry the question to a finer level of detail. For example, How valuable are roadside signs and where should they be placed?

Evaluation techniques for assessing the value of specific program components are clearly desired, and these lower-level evaluations will probably have to be integrated with the overall program evaluation procedures. This has been done in only a few instances so far.

Extending this logic in the other direction, perhaps more than program activities should be evaluated. Two important examples come to mind:

1. Organization form. Most RSAs are contained within a metropolitan planning organization or the state department of transportation, and for RSA staff this organization form is a given. But considering the curious public-private character of most ridesharing promotion, is this the best organizational form? What unique local characteristics will affect this issue?
2. Personalities. I have heard a number of knowledgeable ridesharing practitioners claim that the single most important determinant of success or failure of an RSA rests in the personality and capabilities of the key person(s) at that RSA. Can we develop a set of desirable characteristics? (This would certainly be helpful when new RSA staff is being sought.) And who will do the evaluating of current RSA staff?

Understanding the Long Range

There are at least two important long-range considerations worthy of further investigation:

1. Long-range, external trends that affect ridesharing. The most obvious example would be the price of motor fuel, but there are numerous others, including availability of motor fuel; downsizing of automobiles and increasing fuel economy; geographic trends (e.g., the back-to-the-city movement); demographic changes (e.g., family size and age distributions); and economic changes (e.g., disposable income, cost of automobiles, and unemployment levels); and
2. Long-range effects of ridesharing. Some of these effects are captured by the MOEs discussed above, but others may also be important: changes in automobile ownership (and demand for new automobiles), in choice of residence or work locations, in quality of life, and in employee productivity.

Study of Information-Dissemination Techniques

There are five major categories of information-sharing techniques that are in common use by RSA staff:

1. Newsletters published by the U.S. Department of Transportation (DOT), state departments of transportation, some RSAs, etc. These should be highly accessible (though not everyone knows about them), but they are limited to superficial treatments of a relatively small number of topics.
2. National conferences, including the National Ridesharing Conference (which has been held every two or three years in the past but may be held annually in the future), and other national gatherings such as the TRB Annual Meeting and National Association of Vanpool Operators meetings. These provide in-depth treatment of specific topics, often allowing limited audience discussion, but comprehensive treatment of subjects is usually lacking. The major limitation is accessibility; increasingly limited government travel budgets usually limit attendance to one person per RSA (if that).
3. Local or regional workshops, including the relatively structured workshops conducted by federal agencies and others, plus the less-formal local or statewide gatherings that are periodically arranged. Such workshops are capable of in-depth and comprehensive treatments that permit much audience participation, but they can sometimes be quite expensive if they are well done. Accessibility is a growing problem here, because many government employees are not authorized to travel out of state to regional gatherings.
4. Federal Highway Administration (FHWA) technical assistance, including the services of the National Ridesharing Information Center plus the telephone consultation and site visits to RSAs provided by several well-known consultants under contract to FHWA and the Urban Mass Transportation Administration (UMTA).
5. The grapevine—this channel is usually based on contacts made through the above four channels. Usually, it is rather haphazard, because an RSA staff person struggling with a problem cannot easily identify other RSAs who have faced that same problem. But when this channel does work, it often works superbly.

These channels appear to work largely independently of each other. Is more coordination needed? How should this be accomplished? Is there need for more coordination or changes within each channel?

A Better Understanding of Ridesharing Formation-Dissolution Process

It is not clear where this should go in the priority ranking scheme. Most RSAs take a very simplistic view of the ridesharing formation process. If a person is driving alone at the time of application to the RSA and if RSA services resulted in that person joining or forming a carpool, vanpool, etc., then the RSA will take credit for one person placed. An enlightened critic might contend that some of those applicants would have formed a carpool by themselves, without RSA assistance. This nubol of negativism stubbornly maintains that an RSA's impacts must be compared with what would have existed had the RSA not been on the scene. Certainly, a cold-blooded funder could feel justified in taking this position.

The rejoinder of the fast-thinking ridesharing advocate could be, an RSA accomplishes more than placing poolers. It also increases awareness and helps change attitudes about commuting. This is likely to have a deferred but perhaps substantial long-range impact on commuter modal-choice behavior, including those commuters who apply for services but are not placed into pools, plus those commuters who are reached by the indirect mechanisms discussed earlier. How will the RSA get credit for these invisible, long-range impacts?

A better understanding of the process by which commuters move into, between, and out of pooling arrangements would not only make for more equitable RSA evaluations but would also enable the RSA staff to better understand both their customers and the services the RSA offers. This should improve the performance of most RSAs significantly.

CONCLUSION

Several questions must be asked about each of the research issues raised in this presentation.

1. How important is it? What priority should it be given in view of increasingly limited research funding? What benefits can be expected?
2. How does it relate with the other evaluation issues and with other research topics in ridesharing or beyond?
3. What roles should be played in performing the research for each issue? At a minimum, the players should include RSA staffs, funders, state and federal government representatives, and independent research organizations.

RECOMMENDATIONS

Based on my participation in the recent series of FHWA and UMTA ridesharing workshops during which I came into contact with staff from most of the several hundred ridesharing agencies nationwide, I recommend that a two-pronged program of research be undertaken to advance both the state of the art and the state of the practice of ridesharing programs.

State of the Art

Because ridesharing is such a new field, it is not
surprising that there is much pure research needed. As mentioned above, there is much to be learned about the various aspects of the commuter modal-choice process--incentives and disincentives to commuters and employers, the social factors inherent in the ridesharing arrangement, and the impact of long-range social and economic trends, for example. This is clearly the stuff of research work as it is traditionally known to TRB and most of the participants at this workshop. TRB is an excellent forum for structuring and guiding this research effort.

State of the Practice

I have argued strongly (and convincingly, I hope) that there is a large chasm between the research community and the practitioners. Many RSAs operate in isolation. They are largely unaware of the research results that most people at this conference take for granted. Most RSAs operate with very limited resources. Thus, some of their most immediate needs are quite basic—for example, the need for simple evaluation procedures that can be carried out by a nonexpert. There is much evaluation research work to be done that is not very glamorous, but it is very needed by ridesharing practitioners.

My bias should be obvious at this point. I feel that the greatest need, at present, is to advance the state of the practice by producing and disseminating research findings that are immediately usable.

REFERENCES

Part 4
Participants
Robert D. Owens, 3M Company, St. Paul, Minnesota

Neil Peterson, Municipality of Metropolitan Seattle-METRO, Seattle
Lew Fratsch, U.S. Department of Energy

Barbara K. Reichart, Federal Highway Administration, U.S. Department of Transportation
Richard H. Ribner, Golden Gate Bridge, Highway, and Transportation District, San Francisco
William T. Roach, Seattle-King County Commuter Pool, Seattle
Daniel J. Roos, Center for Transportation Studies, Massachusetts Institute of Technology, Cambridge
Amy M. Rosen, New Jersey Department of Transportation, Trenton
Morris J. Rothenberg, JHK and Associates, Alexandria, Virginia

Linda Schuck, Alliance to Save Energy, Washington, D.C.
Oliver Schueftan, Peat, Marwick, Mitchell and Company, Washington, D.C.
James A. Scott, Transportation Research Board
Julie Sgarzi, Office of the Mayor, City of Los Angeles, Los Angeles
Clarence Shallbetter, Ridesharing, Inc., St. Paul, Minnesota

Frank Spielberg, SG Associates, Inc., Annandale, Virginia
Charna E. Staten, RIDES for Bay Area Commuters, Inc., San Francisco
Stan R. Stokey, Tennessee Valley Authority, Knoxville
John H. Suhrbier, Cambridge Systematics, Inc., Cambridge, Massachusetts
Harry P. Surratt, Jr., New River Valley Planning District Commission, Radford, Virginia
Roger F. Teal, University of California, Irvine
Donald A. Torluemke, Aerospace Corporation, El Segundo, California

Peter J. Valk, Commuter Transportation Services, Inc., Los Angeles
Steve Verney, Share-the-Ride, State University of New York, Buffalo

Barry E. Welch, Alliance to Save Energy, Washington, D.C.
Kenneth W. Wester, Virginia Department of Highways and Transportation, Richmond
Philip Winters, Applied Ridesharing Technology, Inc., Knoxville, Tennessee

Byron L. York, Tri-Met Rideshare Project, Portland, Oregon
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