

Seeing the Trees and Missing the Forest: Qualitative Versus Quantitative Research Findings in a Model Transportation Demand Management Program Evaluation

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Following the traditional procedural methodology of modern research using "objective," quantitative designs for understanding and planning transportation systems, transportation researchers from a number of disciplines, including psychology, sociology, planning, engineering, organizational behavior, and others in 20 years of studies have sought to measure and understand the human factor and apply the results to planning and public policy formation. Such quantitative evaluations on whether a program achieved a statistically significant effect are frequently misleading and often of little value to decision makers. They neglect by design the relationship between what was desired and what was delivered, the relationship between official programmatic goals and the goals of the users, and the differences between the various stakeholders, each of whom has a unique interest in the program. Qualitative methods, as part of an overall evaluation design, thus have an important and overlooked place in transportation research. A conjoint, multi-method quantitative and qualitative study of a model transportation demand management program is described in which the favorable findings of the typical quantitative work are in conflict with the larger issues of importance to program users and nonuser stakeholders as discovered in the qualitative study.

For a number of years, the dominant mode of thinking and the research conducted in transportation planning have been based on a linear, regression type of model emphasizing travel time and cost factors to explain an individual's travel behaviors and choices. On the basis of such thinking, linear quantitative methods were used and linear behavioral explanations were suggested: "If a cost disparity did not exist, just as many commuters would be seen riding in carpools, vanpools, and buses as driving alone to work" (1, p. 16).

In the last several years, the need to increase the scope of research factors by adding more personal variables has been addressed by a number of authors (2,3). However, the inclusion of individual psychological factors in and of themselves cannot deal with problems whose roots are in the methodologies used to study, understand, and plan in transportation research.

Study after study in the field is based on results gathered from some type of objective "black box" survey research (4) that measures reports of actual behaviors or relevant attitudes toward certain policies or procedures, or both. Within the realm of transportation demand management (TDM), surveys are typically taken of actual single-occupant-vehicle (SOV) and multiple-occupant-vehicle

(MOV) usage. They are then compared with the program incentives and disincentives to SOV travel to determine relative "measures of effectiveness." The number of such studies is large and growing (see, for example, nos. 1203, 1212, and 1321 in the *Transportation Research Record* series). Generally the conclusions, although not completely uniform, tend to report some variation of the finding that "the monthly charge for employee parking on site was found to be the single most influential factor for determining the percent of employees that drive alone to work" (5, p. 109).

On occasion, people's attitudes toward various SOV and MOV options are surveyed as well. The world of the survey, however, is bounded by the perspectives and goals of the survey writers. The survey restricts not only the question frame but the answer frame as well, anticipating the important issues and questions and the responses.

This type of survey usually begins with a statement about the importance of "psychological factors" in traveler behavior and goes on to measure the predefined factors that the survey writers have determined to be of importance. Not infrequently, these psychological factors turn out to be important "intervening variables in understanding individual behaviors and decisions."

To overcome this predirection, some studies have included focus groups in their work to better understand the factors that are a part of decision making [see, for example, Polena and Glazer (6)]. Although the focus group can overcome the closed-end nature of the survey, it contains its own limitations, not the least of which are the drive for normative responses within the group and the lack of confidentiality. The latter can be especially important when asking about positives and negatives regarding the policies and personnel of one's employer.

One major reason for the omnipresent use of the quantitative methodology is the linguistic framing that occurs in describing it. Such methods are described as objective. Qualitative methods that seek to understand and gather participants' perceptions and beliefs are labeled subjective. With modern researcher norms, it is understandable that there is a strong level of support for methods that are described as objective.

Although there can be no doubt that the researcher needs to be free of presupposition and bias (observer objective), subjective beliefs and behavior on the part of those being studied (by the same objective observer) is the heart of qualitative research and is a legitimate and vital part of scientific work. Qualitative research is also vital to understanding the complexity of transportation behavior, which rests upon the subjective beliefs and behaviors of the individual person.

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A direct outcome of this automatic methodological response choice has been to direct efforts away from qualitative work when this technique would prove useful in understanding personal variables and their roles in transportation behavior. The framing of the issue as one of objective versus subjective work has meant that only quantitative research is seen as objective and hence as "scientific." Little wonder then that researchers have avoided these not just subjective but also "unscientific" studies and methods.

The hope which originally inspired [quantitative] methodology was the hope of finding a method of inquiry which would be both necessary and sufficient to guide the scientist unerringly to truth. This hope has died a natural death. (7)

After the first flush of success in measuring social programs in terms of their quantified usage, a number of researchers recognized that whatever the results of such reports, they failed to answer the critical question of why. Without such knowledge "failing" programs could not be corrected and successful programs could not be transferred to other locations (8). Managers, politicians, and planners frequently report that such evaluation studies fail to provide them with needed information and often are not used in decision making (9).

The management sciences have come to recognize that even the best organizational procedures administered by the most competent staff cannot replace the need for a more fluid and dynamic hands-on contact to keep in touch with what is going on. This is usually referred to as "management by wandering around" (10).

METHOD

Charged with evaluating a new and model TDM program for a major government employer, the organization used a typical methodology: a quantitative survey questionnaire. The actual survey was based on forms used by other governmental agencies. The questionnaire asked employees about means of commuting to work (eight options) each of the previous 5 work days, whether the prior week's commuting pattern was typical for their normal commute, the number of miles they commute to work from their home one way, and about level of satisfaction with the program.

Recognizing the problems in "research as usual" and trying to overcome them, the author used an additional and different approach: a multimethod combination of traditional quantitative research and a detailed, systematic, qualitative study: "research by wandering around."

In addition to the standard survey and numbers design, a qualitative research methodology was used involving one-on-one, semi-structured interviews. Interviews were conducted with more than 250 participating and nonparticipating employees at three work locations during a 4-month period. Each interview lasted from 10 min to 1/2 hr or more.

Each interview addressed issues involving the employee's commuting patterns and choices, the reasons for those patterns and choices, as well as his or her knowledge about and attitudes toward the organization's TDM program. The content of early interviews guided questions in later interviews. Data collection and analysis followed the process described by Kram (11, p. 254):

As interviews are conducted, initial insights emerge about the phenomenon that is being studied. These new insights influence the kinds of questions that seem important to ask in subsequent interviews. This

inductive process is characterized by continuous movement between data and concepts . . . to explain what has been observed.

The results of these interviews provided some unexpected and disturbing information on peoples' perceptions of TDM. These results are presented to show what individuals thought was important—not simply their ratings of what the researchers thought a priori was important.

The overarching purpose of this work was to search out what people were seeing, hearing, and feeling; to look at them and listen to them in their own words; to compare the results and findings of the two methods; and ultimately to generate clearer discussion and direction for future research. Detailed descriptions and analyses of qualitative versus quantitative research methodology are beyond the scope of this paper. It is also not the primary purpose to provide an analysis of the organization in question. Thus, identifying details of the organization have been excluded from this report.

DESCRIPTION OF ORGANIZATION

The organization in question is a moderate-sized governmental entity. It has approximately 550 full-time employees. The three work sites are of roughly equal size and accommodate approximately equal numbers of employees. The northernmost site is approximately 10 mi north of the other sites, which are within 3 mi of each other.

The northernmost and southernmost sites are staffed primarily by unionized service employees along with a small complement of nonunionized support staff and various managers. The central site functions as the organizational headquarters and, as such, it is primarily home to management and support staff.

All locations are close to and have easy access to major freeways and highways and have ample free parking. The central location has very good transit access, whereas the north and south locations do not.

DESCRIPTION OF PROGRAM

The program was designed to serve as a model for other public- and private-sector employers in the area. The focus of the program was on incentives. The organization subsidizes employees who commute to work in other than SOVs through a direct reimbursement for out-of-pocket costs.

Employees who wish to ride a local public-transit vehicle to work are given an annual pass allowing them to ride free. Those who must take other public transit out of the local area are reimbursed up to \$46.00/month on the basis of the distance traveled. The organization requires that other-than-SOV commuting to work occur at least 75 percent of the time per month for eligibility for such a reimbursement.

Because the hours of many of the workers are so widespread, carpooling plays an important role in the TDM program efforts. The program reimburses carpool drivers also up to \$46.00/month on the basis of the distance traveled. Carpoolers also receive preferential parking at each of the work sites, which consists of reserved parking in spots closest to entrances.

A carpool was defined here as a two-occupant vehicle. The second carpool occupant does not need to be an employee of the organization but must be an adult commuting to or from work. In this

way the organization feels that it is contributing to the overall work-related trip reductions in the local area. A ridesharing service exists both within the organization and regionally.

One group the organization did not want to overlook was the non-reimbursable participants. The organization has employees who commute to work by riding local transit, riding bicycles, walking, and of course carpooling. One incentive that was offered to them, as well as to the reimbursable participants, was a monthly cash drawing. Each month, six \$50.00 cash prizes, two at each location, were awarded from the names of all monthly participants by a random drawing.

RESULTS

The mandated survey showed that there was a 21 percent decrease in the numbers of employees who drove alone to work in the 2-year period the program had been in effect. The program was declared a success. The interviews indicated, however, four main areas of concern: individual/psychological factors, social factors, organizational factors, and external/economic factors.

Individual/Psychological Factors

The existence of an American "love affair" with the car is a common concept. According to Angell and Ercolano (12), for example, "Despite a relative wealth of options . . . commuters . . . have developed an attachment to their automobiles that transcends convenient transportation and has become almost an obsession." Although the numbers clearly show that people to date have overwhelmingly chosen the SOV for commuting, an inherent love of the car or even of driving per se is not the reason given. Of 253 individuals interviewed, only 5 mentioned any sort of love affair with driving or with their cars. Moreover, this was from people who had chosen to carpool or vanpool and had abandoned the SOV. Their remarks centered on missing the comforts of their more luxurious cars compared with the vehicles they rode in for pooling purposes.

There were even a number of individuals who described themselves as hating their car but being a "car captive" and, hence, an SOV user and not a TDM participant. Although the individual reasons for such feelings differed, the core of the responses was based on lifestyle needs that required wide diversity in trips. Child care, geographically diverse errands, and split-schedule jobs, among other needs, placed people in a position of wanting to use an MOV option but feeling constrained from doing so because of, for example, geographic spread arising from land use and zoning around their homes.

In terms of individual differences in TDM participation and non-participation, there was a continuum of people along the line of introversion/social facilitation. Dedicated, no-chance-of-change non-participants generally preferred being alone and saw their commute times as positive, private moments. For example, "If I don't want to spend my lunch having to be with, and talking to other people, why should I want to be forced to [do so] every morning and every afternoon?"

Under such a set of beliefs and needs a number of alternatives to explain SOV love affairs can be created. One such possibility is the level of privacy or control, that the SOV provides, or is seen to provide, relative to other MOV options. Individuals with such high pri-

vacy or control needs were making decisions on the basis of a multiplicative—not an additive—decision model. If individual privacy or levels of control were considered insufficient, no other positive factor could make up for it because each factor was multiplied (not summed) together; hence, any factor with a weight of 0 led to a total MOV mode evaluation of 0.

Although many people who used MOV described some positive feelings toward reducing pollution, congestion, and the like, MOV use for these goals would clearly be a desirable option only for those who seek out or at least do not object to the company of others during their commute times. For this type of person, resistance to MOV is more a function of psychological comfort zones and desired relaxation time than a linear economic decision or one of psychosexual sublimation.

Another factor involved various individual biases. In a confidential setting, talking with a trusted confederate, many admitted to having a number of preferences about whom they did or would find acceptable (and unacceptable) as commute companions. These biases included gender, race, age, social status and class, and occupational status.

Most organizations are highly class and status bound. People most frequently expressed more reluctance toward commuting with those who were above or below themselves in terms of job status than toward any of the more common biases: that is, they did not wish to ride with people at the levels of either their supervisors or their employees.

Because such attitudes are held in negative esteem and are a source of conflict in our culture, the existence of such attitudes is rarely examined and when it is questioned by researchers, it is rarely acknowledged by subjects. These feelings may also represent general deep-seated values that have been seen as being antecedent to or even causative of specific attitudes and behaviors (13) and as such are functioning at a subconscious level not touched upon by multiple-choice/scaled-response questions.

TDM also represents an intrusion into people's nonwork time. Although individuals recognized the necessity of interacting on the job with people whom they would otherwise not associate with, commute time was clearly seen as "my time, not the company's." Freedom to associate or not associate and freedom to select a mode on their own time were sensitive issues and ones not addressed in most traditional efforts.

All of the above argues strongly against the success of the typical work site, or even the general regional model of seeing people as interchangeable and matchable primarily on the basis of origin and destination points and times (14).

Social Factors

Whether the mode was buses, carpools, vanpools, or rail, the social factors of who was in the group and how to act toward them came up often. "I'm never quite sure how to behave in my carpool. What's OK to talk about, what isn't. At least in an elevator I know what to do—keep quiet and stare at the ceiling!"

Clearly we lack social norms for the general social interactions of most TDM alternatives. For some people this is trivial; to others it is daunting.

We also lack norms and comfort zones for dealing with the many social problems that MOV can bring. "I quit my carpool because I couldn't deal with the stress of having to pressure a coworker with being on time. We'd have words in the morning, then we would

have to work together off and on during the day, then came the long ride home . . . ”

A number of researchers have discussed cultural norms towards individual competition and group cooperation (15,16). An MOV group represents just such a cooperative group effort. In a typical TDM program a brochure may describe how to form a carpool or perhaps even how to deal with some of the conflicts that arise. An on-site program coordinator may be available (as was the author), but people wanted and needed more. “I’m just a shy person. I don’t like calling or talking to strangers . . . and none of my friends worked out for a carpool . . . so I just dropped the whole thing.” Contrast the above with the comfort zone of individuals who are willing participants in another phenomenon—the casual carpool. In a number of areas, such as suburban Washington, D.C., and San Francisco, casual carpools have arisen in which total strangers drive and ride with others to form “on demand,” “instant,” or “casual” carpools to get the benefits of localized highway TDM incentives such as the use of HOV lanes, waiving of bridge tolls, and the like (17).

For some individuals such as one worker in the sample, a casual carpool may be an acceptable solution to choosing an MOV precisely because the temporary nature of the carpool decreases the need for social interaction and feelings of social responsibility that are based on being in an ongoing group. “You don’t have to worry what they think [of you] ’cause you know you’re probably never going to see them again.”

The bus, but not the train/light rail vehicle, was also seen as a low-social-status vehicle—one fraught with “too many people, with too little hygiene, packed too close together.” Among managers and professionals there was a social/organizational fear factor that riding public transit could hinder promotions and future opportunities. For them, riding the bus involved a great deal more than just getting to and from work: “I wouldn’t mind riding the bus to work but, when I see [the CEO] or even just my own boss giving up their company car and riding public transit, that’ll be the day I’d give it a try.”

Organizational Factors

The existence of an organizational policy supporting TDM was a necessary but not sufficient condition to determine actual TDM behavior. For most workers, occupational class was a critical factor.

As in most work environments there were three broad classes of employees: the hourly worker, the salaried professional, and the salaried manager. Total MOV use was highest among the former and lowest among the latter. In part this simply reflects the overall difference in the total numbers of the three groups. But there is much more going on.

For the hourly worker, the individual manager was the largest factor in whether an interested employee used an MOV or stopped using one: it was not the chief executive officer, the program coordinator, or the program itself. This finding supports the results reported by Freas and Anderson (18) about use of variable work hour programs. The hourly workers knew this and often resented it.

TDM brought to the forefront a number of the occupational class differences that exist in the traditional, hierarchial workplace. Whereas the hourly workers felt the highest internal desire as a group to use MOVs, they noted with some anger that it was the salaried workers who were in the best position to actually use MOVs. “They can adjust their work schedules, be a few minutes early or late as long as their work gets done, and they aren’t living

hand to mouth where buying a monthly [MOV] pass or parking permit really hurts.”

Whereas the overall company TDM policy was uniform and supportive, the individual managers made or broke the program. “Sure I could take the bus, but I couldn’t leave at 4:55 to catch the express. I had to wait till precisely 5:00, which meant a 30-minute wait for the next local bus that I could use.”

Hourly workers also reported receiving the most pressure to use MOV. Although there were managers who made it difficult if not impossible for a worker to select an MOV option, the opposite was true of managers who wanted high TDM program usage for their sections. “If we drove our own car to work, we were supposed to drop in and explain why we hadn’t taken the [MOV]. And there was never an acceptable reason.”

External/Economic Factors

Although there were none at any of the three work sites, disincentives, particularly parking charges, had been discussed as a possibility. Disincentives are the major lever discussed in most research for changing SOV travel behavior (19).

A number of people recognized and described the typical parking charge as a “regressive” and “discriminatory” fee. Whether the fee is \$5.00 or \$50.00/month, a flat fee is more burdensome on the lower wage earners.

Clearly equality does not equal equity. However, threatening workers who earn \$15,000/year with a parking fee of \$50.00/month (equal to more than 4 percent of annual gross income) will likely be effective in driving them out of their cars. The perception was that “they [salaried workers] get company cars and expense accounts.” “No matter what you charge it won’t come out of their pocket but it [parking fees] means my family having less each month.”

One intriguing suggestion was to “charge everyone who drives to work alone, in a company car or their own private car, the same percentage of their monthly salary—no exceptions, no company reimbursements. And give those who [don’t use an SOV] an equal percentage of salary amount in a bonus . . .” This suggestion was from a senior accountant (and a salaried manager).

DISCUSSION AND CONCLUSIONS

Clearly these accounts from people do not replace quantifiable research and they are not intended to. At the same time, they point out that there are more factors involved interacting in more complex patterns than planners and researchers have generally acknowledged.

The results of the standard TDM survey (Figure 1) indicated that there was a gain in the use of MOV options as a result of the TDM program. Rankings of the overall program were also found to be generally satisfactory. This leads to the typical report of a “successful” TDM program.

At the same time, the qualitative efforts conducted over time in a confidential and trusting relationship (Figure 2), to understand the overall perspectives on the TDM program and SOV versus MOV, generally provided a very different reaction. Many truisms were found to be inaccurate or badly distorted. A number of factors were raised against traditional TDM implementation and programs that could block the success of such programs even in the face of reported “successful” quantitative research findings.

Work Location: TOTAL As of July 10, 1991

How do you presently commute to work? (vs as of August 1989 before TDM program started)

Pre	Post		Pre	Post		Pre	Post
317	243	drive alone	0	3	vanpool		
11	11	company car	4	17	heavy rail		
12	13	bus	2	11	bicycle		
1	3	walk	1	7	other		
4	6	motorcycle	1	37	carpool		
0	2	light rail			Total = 353		

93% 72% SOV usage

FIGURE 1 TDM survey: quantitative results.

In terms of using qualitative methodology, it is not enough to simply pull out such factors from individuals or focus groups and place them into the standard survey. The question of how satisfied one is with A, B, or C begs the question, "Compared with what?" Asking how likely one is to use X, Y, or Z leaves out the question, "But what real choices do I have?"

People who use an MOV as a part of a TDM effort may report being satisfied with their new commute mode and yet still may be disturbed by the fundamental nature of the overall program. By pressuring workers into riding with others and by using equal but inequitable incentives and disincentives, individual programs and legislative actions may breed further antagonism toward company management, government, and public policy organizations.

Concerns raised:

Individual/Psychological

- o Loss of comfort in MOV as compared to SOV.
- o Individual car captivity due to external factors including land use/planning.
- o Preference for privacy/private time.
- o Preference for high level of control vis-a-vis SOV.
- o Biases over who to commute and not commute with, especially organizational class/status.
- o Intrusion by business/government into non-business time.

Social

- o Discomfort in creating a new social group.
- o Discomfort being a part of a social group.
- o Discomfort dealing with positive/negative behaviors in an MOV.
- o Lack of clear social norms for MOVs.
- o Low social/work status in using MOVs.

Organizational

- o Lack of support for MOV usage by individual managers.
- o Pressure to use MOV's by individual managers.
- o Resentment towards schedule flexible salaried workers by hourly wage workers.

External/Economic

- o Flat fees for SOV usage seen as regressive and discriminatory.
- o Ability of high income/status individuals to pass along to company/gov't any increased costs.

FIGURE 2 TDM survey: qualitative results.

Methodologies are just tools. They may be appropriate or inappropriate in a given setting. However, when the only research tool one has (or will use) is a (quantitative) hammer, then all research questions look like nails. Naturalistic research based on qualitative methods helps to better explore and understand the various stakeholders' concerns, needs, and feelings rather than just their behaviors.

There are many stakeholders present in an organizational or social environment, including senior management, program implementers, and individual users. Such flexible methods provide rich, firsthand knowledge of how a program is being implemented, the real-world problems of the implementors and users, and the complex interactions between the groups.

The qualitative method is neither a panacea nor a replacement for the quantitative method per se. It is useful when the full range of issues is unknown or cannot be fully clarified before the evaluation program begins, where there are a large number of diverse stakeholders to be considered, and especially when there is a need for information about processes and not just outcomes. What is most effective is a dynamic, multiplistic approach that is designed to use multiple methods and investigate multiple and interactive issues and that involves the views of the full spectrum of relevant stakeholders.

Ultimately it is the individual who must judge the desirability, convenience, and the safety of mass transit, carpooling, and other alternatives to the SOV. Although surveying behavioral changes—even surveying attitudes and attitudinal changes—lets one see and count the "trees," it is no substitute for understanding (and meeting) the diverse concerns and feelings of all the individuals whose behaviors the various programs seek to influence.

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This paper reflects the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The paper does not necessarily reflect the official views of the University of Washington, the Washington State Transportation Commission, Department of Transportation, FHWA, or any other organization. This paper does not constitute a standard, specification, or regulation.

Publication of this paper sponsored by Task Force on Transportation Demand Management.