Service Planning and Marketing

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Two models are discussed for predicting the demand estimate for new transit services or service modification—macroscopic mathematical models based on land-use and population characteristics and marketing models based on consumer awareness of and attitude toward service. The way consumer marketing was applied to the Nashville marketing demonstration project sponsored by the Urban Mass Transportation Administration is described. Attitudinal change was more predictive of increased ridership than any other factor. A methodology and a predictive equation based on theoretical data for quantifying the relation between consumer attitudes and transportation ridership is proposed.

In this paper, I will focus on one particular area of the transportation planning process—the demand estimate for a new service or service modification. This area has become the subject of some of the most complex methodologies in the planning process. Macroscopic mathematical models are being used to screen alternative transportation systems and to consider the problem of estimating the numbers of trips that will be made on alternative modes. The most commonly used models separate travel into a sequential set of analyses dealing with trip generation, trip distribution, modal split, and trip assignment to network links, not necessarily in that order, and with some of the steps sometimes combined. There are many variations on the theme, but certain basic data requirements generally apply.

Trip generation is normally modeled as being dependent on land-use and population characteristics, such as dwelling units per unit area, average number of automobiles per household, and median income per household. Trip distribution is most often described by the so-called gravity model, where the number of trips from zone A to zone B is directly proportional to the trip-generating capacity of zone A and the trip-attracting capacity of zone B and inversely proportional to some measure of the impedence between the two zones. Trip-attracting capacity is usually modeled in terms of such characteristics as total employment or employees per unit area of various kinds of commercial and industrial uses. Modal split is usually described in terms of the comparative characteristics of the competing modes, as well as certain population characteristics. Thus, the input data requirements may include such factors as range of household income, number of automobiles per worker, difference in out-of-vehicle travel time between competing modes, difference in in-vehicle travel time between competing modes, and difference in cost relative to income for the competing modes.

The next step is to calibrate the model based on relevant experience and to determine the values of the constants in the equation.

In general, calibration requires the collection of sample data for the dependent and independent variables in the model system. In the case of transportation models, the dependent-variable data are basically the trip-identification quantities, i.e., the number of trips by purpose and mode and origin-and-destination information. The independent-variable data are those types of data described above. The aggregated models, where the study area is divided into zones, require sample sizes of 30 000 to 40 000 for large urban areas. The more recently developed disaggregated models require sample sizes of approximately several hundred. In disaggregated models, the unit of behavior is the individual trip maker or the household and the modeling approach is designed to use individual observations rather than zonal aggregates.

In the calibration process, the trip data are processed so that computed trips can be compared with actual trips and the models are adjusted until satisfactory agreement is achieved. When the model is to be used to evaluate alternative transit systems for an area that has little or no directly applicable local transit experience for modal-split model calibration, the usual solution is to borrow models that have been calibrated for other areas with reasonably similar demographic characteristics and then test and adapt them with whatever transit data are available for the actual study area.

Among other things, these models are being used to measure estimated ridership, potential effects on other modes, costs, and anticipated revenues. I believe it is a fair generalization to say that they are most useful in connection with the physical and service parameters of the macrosystem (plus certain policy issues) before the introduction of the service. The issue now is the relation of this process to consumer marketing and whether an understanding of marketing can aid in the development of services and the estimation of demand.

Before addressing this issue, I would like to ask two basic questions:

1. What do we mean by consumer marketing?
2. Is public transportation a consumer product?

To answer the first question, I would first like to tell you what marketing is not—it is not selling. Selling is concerned with the need to convert a given product to cash, and it focuses on the needs of the seller. Marketing, however, is a business perspective based on the concept of understanding and satisfying the needs of the consumer.

If this definition appears to be very broad, that is because marketing in the modern sense has a very broad perspective—it is the totality of understanding and responding to what the consumer wants. With this perspective, we can see that marketing includes many aspects of the business process—e.g., research, product development, pricing, distribution, strategy, promotion, and advertising. The development of a marketing plan involves four basic components—situation analysis, quantification of objectives, formulation of strategy, and the action program.

Does this planning procedure relate to the planning (modeling) process described above? In some ways it does and in others it does not. Many of the variables used in the input and calibration of the models would be included in a marketing situation analysis. These include economic variables such as employment; demographic variables such as household income and automobiles per household; behavioral variables such as trips by type, origin, and destination; and competitive variables such as modal split and relative costs. But the models do not include one of the key variables in the prediction of human behavior—i.e., the levels of awareness of and attitudes toward a given product or service. Failure to recognize the importance of these factors can lead to incorrect estimates of demand. Let me give you some examples of what I mean.

It would seem obvious that awareness of a product or service is the sine qua non of demand estimating. It is a fallacy to assume this factor to be 100 percent, especially in the case of a new service or a service modification. Consumer marketers spend tens of millions of dollars to let people know they have a new product or have changed their product. Many of you probably know of at least one situation where a service has failed and the subsequent analysis has shown that the failure was due to a lack of awareness by the persons it was intended to serve. You notice that I said "the persons it was intended to serve"; it is important that awareness be measured in terms of the potential user segment—e.g., the elderly and handicapped or shoppers—and not some other group such as politicians, advertising persons, or mothers-in-law (unless those are the consumers to whom the service is targeted).

One example of the failure to use an attitudinal demand prediction can be found in the automotive market. In 1973, a major automobile manufacturer was told that the (then) current demand for small automobiles appeared to be a function of the oil embargo and economic recession, but that attitudinal research showed an underlying desire for larger automobiles. It was hypothesized that when and if external conditions changed, the demand for large automobiles would again increase. The manufacturer involved chose not to accept this analysis, and in early 1975, after the crisis had ended, found itself with an oversupply of compact automobiles and an inability to produce enough large ones to meet the demand.

This example gives me the opportunity to mention the one variable that overwhelms all predictors—the government. Today, we see the demise of the large automobile not so much as a response to a change in consumer desires, but as a response to legislation. Therefore, when making demand predictions, one should always be aware of the legal or regulatory condition.

To return to the main thrust of this paper, we come to the second question I posed above. Is public transportation a consumer product? Some persons might argue that it is a utility, a monopoly, or something else. I believe it is a consumer product because, for most persons, it involves free choice. Although some consumers are captive to public transportation, the majority have a modal choice based on their perceptions of such things as cost, speed, comfort, and convenience. Even the so-called captive riders have an expanded trip potential because they can choose to take some trips or not depending on their perception of the transportation being offered to them. Therefore, public transportation is a consumer product because it is subject to competitive choices. If this is correct, we should be able to demonstrate that attitudes do affect choice in public transportation.

The Urban Mass Transportation Administration (UMTA) sponsored a marketing demonstration project in Nashville that was an attempt to apply the principles of modern consumer marketing to transit. A marketing plan was developed much along the lines I have described—situation analysis, objectives, strategy, and action plan. The situation analysis included a major piece of consumer attitudinal research, and these results were used as a basis for the other steps in the planning process. A major marketing and communications program was begun in January 1976 and continued through the entire year with additional input at a lower level in 1977. The program included additional travel of 380 000 km (600 000 miles) that the research had indicated would meet consumer needs—remember that marketing includes product design. The results are shown below (1 km = 0.6 mile).

Item	Time		
	12/1/74 to 11/30/75	12/1/75 to 11/30/76	8/1/76 to 7/31/77
Revenue passengers	7 027 000	7 790 000	8 249 000
Passengers per kilometer	1.1	1.1	1.2

The ridership increased 10 percent in the initial year and has continued to climb at a similar rate. Even with the increase in travel distances, the system has experienced an increase in passengers per vehicle kilometer. What changed in Nashville that would predict such an increase in demand? Not dwelling units per unit area or average number of automobiles per household or median income—what changed were attitudes. The overall rating of the bus system given below shows that the number of people in Nashville who rated the system excellent or very good increased almost 250 percent (from 17 to 42 percent) in this period.

Rating of Service	Percentage of Respondents	
	Preadvertising	Postadvertising
Excellent	4	10
Very good	13	32
Good	44	36
Fair	24	16
Not so good	6	4
Poor	9	2

For persons in the work-trip segment, those rating the bus (versus the automobile) as extremely satisfactory increased from -8 to +10 percent.

For me, this demonstration clearly indicates a relation between consumer attitudes and transportation ridership. The task now is to develop a methodology for quantifying this relation to help predict demand. Again, I will turn to work that has been done in consumer package-goods marketing to develop a predictive equation.

Let us begin by defining our terms. At any point in time, the market for a good or service has two components: new triers (NTs) and repeat buyers (RBs). A simple model can help to explain the dynamics of a market over time.

$$\text{Sales} = \text{NT} + \text{RB} \tag{1}$$

At the introduction of a good or service, NT = 100 percent and RB = 0 percent, and in the postintroduction period, NT < 100 percent and RB ≥ 0 percent. Experience has shown that trial is a function of awareness and positive attitudes, and repeat purchase is a function of experience-based positive attitudes. The next object is to demonstrate a procedure whereby values can be assigned to these terms.

In market research, dichotomous statements of purchase intent such as "yes" or "no" and "will" or "won't" have been found to be poor predictors of future behavior. In transportation planning, this is also true. The positive answers have usually overstated the results by a large factor. Because of this phenomenon, verbal scales—"extremely likely" to "not at all likely"—have been developed to express purchase intent. Thus, to estimate positive intention, it is necessary to present a description of the concept of the service change or innovation to a random sample of target-segment consumers—those persons the system is intended to serve. This process is equally applicable to fixed-route and non-fixed-route systems, transit, and paratransit. It also has the advantage of dealing with the total concept of the service product, including not only basic aspects, such as scheduling type of equipment and cost, but also amenities, such as shelters. It is important that the consumer be given a

meaningfully accurate description of the service on which to base his or her decision.

A simple mathematical formula has been developed for calculating purchase intenders (PIs) from the scalar response to a product concept.

$$PI = (0.5 \times \text{extremely likely}) + (0.2 \times \text{very likely}) \quad (2)$$

However, it may be necessary to calibrate this function differently for transportation services. In a theoretical concept test, an awareness (A) among the sample respondents of 100 percent was induced, and trial rates at other levels of awareness can be estimated as shown below.

$$NT = 100\% A \times PI \quad (3)$$

Estimate	Method
1	70% A x PI
2	50% A x PI
3	25% A x PI

This procedure will tell you the level of awareness that will be needed to induce sufficient trial of the service and give it a chance to succeed. This is very much an interactive model in that with each answer a new question can be asked. At this point, you can decide whether or not the concept can produce enough trial to be worthy of further testing.

Now we have estimates of trial but, to verify these estimates and calculate repeat buying, we must do a real in-market test because repeat purchase intention is based on actual experience. This is a key point—advertising can create awareness and induce positive trial intent, but the service itself must live up to expectations to create repeat buying. As an extreme example, ideal communications could create 100 percent trial, and poor product delivery could cause 0 percent repeat, so that at a postintroduction time, there would be no sales.

The in-market test can be one of two types: a vitality or a projectable test market. A vitality test market is one in which aspects of the test are artificially extreme, such as the incidence of the target segment in the population, and the level of communications used is much higher than could be expended outside the test environment. Such a test will induce abnormally high levels of awareness and trial, but will give good repeat estimates in a comparatively short time. A failure in a vitality test is usually irreversible. On the other hand, a projectable test market attempts to reproduce conditions exactly as they will occur in the total market. This produces accurate estimates of both trial and repeat purchase, but takes a longer time to do it.

In either case, it is next necessary to conduct another survey during the test market to determine the level of awareness in the target segment, the number who have tried, and the number who intend to try but have not done so yet; among the triers, we need to know those who have repeated and those who intend to repeat. By means of this research, the planner does not have to wait a year or more for the market to mature fully in terms of trial and repeat, but can use the research data to project the end results. By calculating the total estimated triers (TET) and the estimated repeat rate (ERR), we can produce a final estimate of demand (FED).

$$TET = \text{actual triers} + PIs \quad (4)$$

$$ERR = \text{actual RBs} + \text{repeat intenders} \quad (5)$$

$$FED = TETs \times ERR \quad (6)$$

This simple model has proven highly effective in predicting actual sales of many new products and marketing strategies. Its strength lies in its ability to reproduce the human decision-making process—positive attitudes predict positive behavior—and the key that unlocks the model is the verbal intention scale used in consumer surveys.

This process is summarized below and is being followed in the research and development project needs of the handicapped sponsored by UMTA.

Step 1: Analytically derive or hypothesize a need among a specific consumer target segment.
Step 2: Develop service concept(s).
Step 3: Test the service concept(s) through marketing research surveys to establish theoretical trial levels.
Step 4: Evaluate trial estimates to decide the workability of the concept.
Step 5: Introduce the concept into a test market.
Step 6: Conduct a survey among the target segment to establish awareness, trial intention, repeat use, and intended repeat use.
Step 7: Estimate the final demand for service.

Step 1 in this process is one possible link to the traditional transportation planning process. This is the point at which the identification of a consumer need is made. In consumer marketing, this identification is made through a situation analysis that uses secondary source material—e.g., population statistics or origin-destination studies—plus consumer attitude research. But it is equally possible to use the output of a transportation planning model at this point in the marketing process.

Step 2 takes the identified need and develops a service concept or set of concepts. These should be brief verbal (plus pictorial if possible) descriptions of the planned service innovation or modification. Although brief, the key elements of the service offer—the type of service, its frequency, its fixed-route or demand nature, whom it is intended to serve, cost to user, and such—should be included. As is being done in the study of the handicapped, the planner might want to create several different concepts aimed at the same need, each with different implied levels of service and different costs. By comparing the estimates of demand derived from these alternative concepts (step 3), he or she can then evaluate the cost-effectiveness of each.

Step 3 involves the exposure of the test concepts to a random sample of target consumers; that is, those whom the service is intended to serve. These samples can vary in size from a few hundred for a local route modification to a thousand or more as in the national study of the handicapped. From an analysis of the stated likelihood to try of this sample, the trial rate for each of the service concepts can be estimated. At this point (step 4), the planner must decide whether the level(s) estimated represent a chance for success of the service by the criteria that are being used to evaluate its feasibility (running at a profit, breaking even, or experiencing a given level of loss made up by subsidy).

Once the planner has decided that the concept is feasible in theory, he or she can introduce it into a test market (step 5). Either a projectable test market that in microcosm fairly represents the city, county, state, region, or country to be ultimately served or a vitality test market where the potential demand is known to be greater than that in the ultimate service area can be chosen. In either type of test, the reality of the service must be tested against the reaction to its verbal concept (step 6). Are the frequency, service, cost, and such as envisioned in the concept? Has the consumer been made aware; what are the actual trial rates; what are the repeat rates?

The answers to these questions must be gathered in another consumer study. The results of this research can then be used, not only to develop a final demand estimate (step 7), but also to modify and improve the service offering to enhance its appeal.

This may seem to be a complex, costly, and extended process, but many consumer marketers have found it to be less complex, costly, or extended than a process of trial and error.

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Discussion

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I would like to begin by thanking Ronald Fisher for his introduction, all of you for the pleasure of being here, and Anthony Morgan for a clearly written and stimulating paper. Then, I will follow with a few of my conclusions and a stream-of-consciousness response to the paper, in support of those conclusions.

CONCLUSIONS

Morgan describes product metamorphosis in the world of marketing in six steps.

1. Research desires: We usually call this goal formulation. The planner attempts to elicit the transportation needs and goals of the persons in the study area and then translates those into objectives against which the proposed service can be judged. Most of this goal formulation is not done at the grass roots level as Morgan would recommend. For historical reasons, we have not greatly exploited attitude surveys; instead, we are very preoccupied with behavior surveys. When the highway planning process, from which we have inherited so much, began in the 1950s, there was an overwhelming desire for greater highway capacity. All that was necessary was to locate the highway, and a simple origin-destination survey was the instrument used. Unfortunately, because of the tremendous impact of our environment on our behavior, what we do does not correlate directly with what we desire. Our planning processes should make much more use of attitude surveys to investigate desires. By so doing, better transportation systems would be designed.

2. Develop a product: In transportation, this translates into design a system or a service. Here we look for a best network, highway, bus route, or other service to satisfy the desires uncovered in step 1. But, what is best? Unfortunately, the desires of the citizen are not always the overriding concern. They are often subordinate to those of the politician, the manufacturer, or the federal-grant administrator bureaucrat. But this is a fact of life and must be appropriately considered, both here and in step 1.

In its initial phases, the development of the plan must depend on the traditional macro or gross techniques outlined by Morgan. A network must be designed, and the complexity of the problem precludes simplistic approaches. Computers are and should be used to great advantage here.

After an initial plan has been developed, we can take it to the target market to obtain their reactions. Armed with network maps, hypothetical bus schedules, slides, movies, and perhaps even a computer terminal with access to a data base describing our proposed plan, we can demonstrate to the citizen our idea and explain its potential effect on his or her quality of life. Of paramount importance here is the awareness of the citizen of the implications of our plan: He or she can query us from his or her own unique but microscopic point of view, and we can survey his or her attitudes. In the case of public transportation, we are particularly interested in the expected demand for the service we are offering. In marketing terms, we want a system designed that has probabilities of trial and repeat that are high enough to justify the service. This is grass-roots citizen participation in the planning process.

3. Price it out: At this stage, the pricing out is the cost-estimation phase of transportation planning. By using the trial probabilities obtained in steps 1 and 2, we can more accurately estimate demand. With a demand estimate, revenue and fleet requirements can be calculated, and a net cost can be computed. (Needless to say, the results can cause great anguish and send the planner back to the drawing board or the bond broker.)

4. Distribute the product: At this point, we implement a subsystem. That is, we provide some service. Unfortunately, we as planners do not spend much time with a transit service after it has been implemented—except perhaps to consider its removal. Morgan advises us to use this introductory period for purposes of calculating the probability of repeat buying.

5. Promote its initial use: Before you can ask someone to repeat a purchase, you have to get him or her to buy it the first time. There must be a significant promotional effort with the introduction of a new service. Once the public has tried a service, they can be asked to use it again. That is how we calculate the probability of repeat buying; it is the sine qua non of demand forecasts in public transportation. Here, again, we have grass-roots citizen participation.

6. Advertise its continued use: Product demand changes. Different people try a product for the first time, and some repeat buyers stop repeating. We must continue to advertise our service to maintain the demand level. At the same time, we should continue to sample and calculate the probability of repeat buying so as to know where to invest our transportation and promotional resources and keep the citizen involved.

In summary, therefore, Morgan has described a commendable and affordable marketing approach that can effectively complement the technical planning process. The transportation planners' macromodels are complemented by the marketers' microsurveys. The simple, straightforward procedure outlined by Morgan can be used to help solve the three most vexing problems of transportation planners: demand estimation, cost estimation, and citizen participation. It is particularly powerful in the context of short-range planning.

SPECIFIC COMMENTS

What follows is a sampling of specific thoughts.

1. The two models described are less alternatives than they are complements. Both should have a role; they support each other's weaknesses. The proposed theoretical model may be somewhat too simple, but a simple beginning is preferable.

2. Service Planning and Marketing is a superb title. Product development, i.e., service design, is indeed

part of the marketing process.

3. The weakest part of the paper is its relatively trite treatment of traditional planning models. These models are the legacy of 1950s highway planning, and that was a time when more highways were needed and wanted. Increased income, improved automobile availability and technology, and the accumulated demand of the war years all created public support and a large budget for a national highway-improvement program. The only planning questions were where and how big to build. These questions were answered by using automobile origin-destination trip tables. These tables were obtained from origin-destination surveys, which were summarized to give present-day trip tables and projected to give future-day trip tables. The (trip-end) modal-split model was initially introduced to remove the bus riders from the trip table for the better estimation of automobile demand. As urban growth accelerated, the simple models were replaced by the gravity model and, later, when engineers were asked to plan transit services as well as highways, more elaborate (trip-interchange) modal-split models were developed and introduced into the process. These models also proved too crude, and more detailed (disaggregate) models were developed. Although it is true that these latter modal-split models can be calibrated with small samples, it has not yet been accepted that disaggregate models can accurately forecast total travel demand from only a small sample. The methods of disaggregate, direct demand forecasts still suffer some implementation difficulties.

4. Morgan could have related marketing to the traditional network design approach. Obviously, there must be a service designed, and it is a highly complex and variable package of goods that we are selling. It must satisfy many different needs and has different appeals to different segments of the market. Indeed, the government's impact is heavy here. To account for all these factors and design a cost-effective service is a challenging task. The market-survey tool is not sufficient for the whole job—although, combined with sophisticated network design models, it is a powerful aid.

5. Customer awareness is the most crucial factor. It is very doubtful that transportation planners do a satisfactory job in making the citizen aware of their transportation plans and the effect those plans will have on him or her. Thus far, awareness has revolved around the funding source (and this is as true for highways as for transit).

6. Of course, the product should satisfy potential users, rather than other groups, such as politicians and bureaucrats, but this is difficult in our political reality. Unfortunately, the transportation planned often has less to do with citizen needs and desires than it does with obtaining a federal grant. The whole planning process is affected by instances of overly stringent legislation and regulations, but perhaps the present move for greater decentralization of the federal process will lessen this problem.

7. Considering the small automobiles versus large automobiles example, it may be that our transit is a little like our small automobiles—badly built and for a misunderstood market. Also, we seem to think of both small automobiles and transit only in a crisis.

8. "Is transit a consumer good?" Of course it is (or perhaps it is a package of goods—and a package of job securities). It is not simply public or mass transportation. The specific product is determined by its service level. Different consumers purchase different products, depending on where they live, work, shop, and play, on how attractive and accessible the automobile-highway system is to them, and on the comfort, convenience, access time, line-haul time, and such of the transit system for them. These factors vary both geographically and sociologically.

9. "Marketing includes product design." This is an enlightening statement. It is the essence of the raison d'être of the paper. Initial research in consumer desires affects product design, trial survey results should affect product design, and repeat survey results (including a test system) should affect design. This would be real citizen participation.

10. In discussing his exemplary experience in Nashville, Morgan takes rhetorical liberties. Obviously, land use, income, and such factors did not change and, equally obviously, individual attitudes did change, but the most important change was the increase in bus availability. This should be emphasized.

11. Among the problems in executing a trial survey, the proper stratification of the potential users vis-à-vis the various service levels requires a sophisticated sample selection that is made easier by the use of the traditional network model and its data base. Another problem is that of providing an accurate portrayal of the (as yet unbuilt) proposed service to the interviewee. Here, again, the traditional models are useful. Computer-drawn maps, schedules, charts, and graphs are obviously useful, and a computer terminal that provides access to the planner's data base can help answer the citizen's questions concerning how the service will affect him or her personally. Finally, movies can dequantify the planning model output and depict expected service and land use. We must be sure the citizen has an accurate picture of the proposed service.

12. In-market testing should be a continuous process, so that system performance can be monitored and the probability of repeat use can be calculated.

13. Ascertaining attitudes is indeed crucial, although difficult, but even more difficult, and the heart of the problem, is forecasting attitudes. We want to correlate transportation service levels and socioeconomic characteristics with attitudes. Then we can use forecasting tools to help us design systems that maximize the expected number of highly likely and very likely users.

Sense of the Session Summary

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The consensus of the session was generally positive about the opportunity to use the methodology of commercial market research for transportation planning.

A major difference between the approach to designing new public transportation services presented by Morgan and existing transportation planning models is clearly stated in Dial's remarks that provide a nice complement to the research paper. Basically, as Dial notes, the current preoccupation is with behavior studies and goal-formulation exercises, and market research takes more of a grass-roots approach that uses attitude surveys to guide service design. Morgan's paper describes an approach to service design and modification by determining actual consumer responses during initial operations. The value of market segmentation was emphasized by several panel members, and the importance of follow-up surveys to identify reasons for repeat use, lack of repeat use, and lack of trial was brought out in the discussion.

There was relatively little disagreement about the need for market research. Perhaps the one area that

could lead to disagreement is that of determining more exactly how market research fits into the transportation planning process. The critical issue now is how to advance current planning practice by incorporating the market research techniques suggested in Morgan's paper. It was very encouraging to see such a large consensus at the session, which may serve as an historic bench mark in this regard. The direction in which short-range transportation planning methodology should move is clearly stated and, for the most part, agreed on. But, how long will it take us?

Labor, Paratransit, and Section 13c

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There are many legal and institutional strategies that transit labor can use to protect itself from unwanted innovation; this paper examines the specific protection given by section 13c of the Urban Mass Transportation Act of 1964. The paper begins with a description of the mass transportation system to which section 13c applies and then describes the use of competitive brokerage for the selection of new mass transportation services. It next discusses the historical context of section 13c and the application of this section to the acquisition of private mass transit companies by using Urban Mass Transportation Administration funds. Finally, the paper describes various applications of section 13c that affect paratransit innovation, including competitive brokerage, and recommends measures for ameliorating any adverse effects such applications may cause.

When trying to understand section 13c of the Urban Mass Transportation Act of 1964, one is tempted to search for some lawyerlike logic behind the statute's rather peculiar concept of giving mass transportation labor almost total job protection similar to the kind enjoyed by the railroad unions. But such a search provides more than the usual number of confusing detours, for section 13c is neither conceptually neat nor particularly logical. It is simply organized labor exerting pressure—first to have the provision included in the act and then to persuade the Secretary of Labor to interpret the provision in a broad and increasingly unwieldy way.

On the other hand, that section 13c lacks conceptual neatness and clear logic will not deter the courts from imposing some order when they are called on to interpret it. And there are several reasons that suggest why section 13c will soon be in the courts: (a) the constraints on the amount of state and local revenue available to run public transportation, (b) the growing competition among various transit and paratransit modes for limited Urban Mass Transportation Administration (UMTA) funds, and (c) the refusal by the U.S. Department of Labor to issue regulations imposing some reasonable limits on the scope of section 13c.

The intent of this paper is not to hasten the approaching lawsuits, but merely to suggest some equitable and logical bases for the courts to use in limiting the effects of section 13c. The paper begins by describing a systems view of transportation and the use of competitive brokerage to select new mass transportation services.

SYSTEMS VIEW OF TRANSPORTATION

Broadly speaking, a transportation system can be described as (a) a family of types and levels of transportation services, (b) allocated through some matching mechanism, (c) to serve distinct service markets. Innovation and improved system efficiency can come not only from improved hardware, but also from better techniques for identifying distinct consumer markets, better mechanisms for matching services with markets, and a more comprehensive view of the available services that make up the system.

It is encouraging that it is now being recognized that not only mass transit, but also the transportation services provided by private automobiles, taxis and other paratransit, pedestrians, and bicyclists are all elements of a single system. It is also being recognized that the goal of transportation policy should be to achieve maximum efficiency for the system as a whole. This is the perspective of the Joint Urban Mass Transportation Administration-Federal Highway Administration Planning Regulations [40 Federal Register 42 976 and following (September 17, 1975), 23 Code of Federal Regulations (CFR) section 450, and 49 CFR section 613], which assign to the metropolitan planning organization (MPO) the task of coordinating the transportation services of an area to achieve system efficiency.

This multimodal-system viewpoint contrasts with the earlier bimodal viewpoint that considered only highways and mass transit. Under the bimodal viewpoint, mass transportation generally was synonomous with conventional mass transit. This simplified the allocation of UMTA funds, which are limited to mass transportation. The only competition for funds was among urban areas, and here the use of formula grants helped UMTA avoid many difficult choices.

Today, however, the competition between conventional mass transit and other potential mass transportation services is making it increasingly difficult for UMTA to determine which service modes within a comprehensive system should be funded. This question is central to the analysis of section 13c, because the labor protection required by this section must be provided only by mass transportation services funded by UMTA.

In addition to the difficulty of determining what mass transportation is for the purpose of UMTA funding, there is the semantic problem associated with the term paratransit. Paratransit is sometimes used loosely to describe the entire range of transportation services between the private automobile and conventional mass transit. Because paratransit literally means "resembling or similar to transit," one could think that all paratransit services are also mass transportation services and eligible for UMTA funds. But this is not the case. Under UMTA's proposed definition of paratransit, the eligible services considered to be nontransit mass transportation include only some of the services between conventional transit and the private automobile: dial-a-ride, jitneys, community minibus, subscription bus service, some van pools, and other shared-ride services that are regularly available to the public [41 Federal Register 46 412 (October 20, 1976)]. A service is regularly available to