Designing Transportation Services: A Marketing Approach

by John R. Hauser° and Frank S. Koppelman°°

ABSTRACT

TO INSURE SUCCESS, transportation innovations must be carefully designed to satisfy consumer needs and must be implemented with a carefully executed marketing strategy. This paper presents an integrated marketing approach to provide the information necessary for managers, planners, and regulators to make strategic decisions with respect to service and marketing strategies.

The first phase of the marketing approach helps the manager design a service strategy that is likely to satisfy consumer needs and desires. It does this by giving him diagnostic information to understand (1) consumers' perceptions of their service options, (2) consumers' preferences for the relative attributes of various services, and (3) how preferences vary across consumer segments. In addition it predicts ridership for potential service mixes so that managers can choose the best service strategy.

The second phase of the marketing approach provides information to help the manager select his marketing mix (advertising, promotion, fare, etc.) and implement the service strategy. These models and measures monitor the behavioral components in the dynamic build-up of ridership, measure the effects of each component in the implementation strategy, and alert the manager so that he can react promptly to modify his strategy to optimally achieve his goals.

The final phase of the marketing approach keeps the manager in touch with his riding public and operating environment so that he can maintain a quality service.

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1. INTRODUCTION

Innovations in transportation services are meant to improve service, or reduce costs, or both. The success of such innovation depends upon how consumers respond by changing their travel habits. A successful innovation will attract and retain riders by providing them with options they view as superior. To insure success planners and managers must design new services based upon an understanding of consumer needs and desires, and must implement the service with an integrated marketing strategy.

This paper presents a methodology for innovation in transportation services. This marketing approach for design, implementation, and monitoring of service draws upon state-of-the-art knowledge and experience in marketing and travel demand forecasting. The design phase uses measures and models of transportation consumer behavior to provide managers with (1) diagnostic information which suggest how best to improve the mix of transportation services and (2) predictions of consumer response needed to evaluate the suggested improvements. The implementation phase then sets the marketing mix (service strategy, service availability, fares, advertising, promotions, etc.) and evaluates the success of the implemented strategy in enhancing ridership or in meeting other objectives. This phase allows dynamic modification of the marketing and service strategies so that managerial goals can best be realized. Finally, the monitoring phase identifies changes in travel needs and in the environment. This enables the transportation manager to react rapidly to the new developments in the social, political, economic, and cultural environments.

The discussion in this paper is adapted from approaches that have been proven successful in the design of innovative health maintenance organizations, management education programs, financial services and banking services [22], in more than seven separate categories of new consumer products [51], and in both consumer products and durables [35]. This success is based on the consumer-oriented common sense approach which carefully considers all important effects influencing market acceptance. The approach is not one of simply selling the service, or of choosing appropriate advertising and promotion. These components are important in getting people to try a new service, but they cannot stand alone. Success requires repeat riders and this comes only through design of the service to meet the needs of consumers.

The marketing approach complements both the standard planning approach [2, 9, 40, 45, 50, 51, 52] and recent developments in transportation attitudinal research [6, 7, 11, 33, 41]. The emphasis is not on particular models, but rather on the solution of managerial problems through the consumer orientation of marketing research.

This paper presents a conceptual approach illustrated with particular models and some empirical experience. It draws on previous research in transportation and marketing and integrates these developments into a single package. Although each component of the approach is illustrated with a single model, the technical references give many related models of varying complexity and accuracy.

2. OVERVIEW OF THE MARKETING APPROACH

If a community introduces a "better" public transportation service chances are the public will not immediately adopt it for much of their daily travel. First, they must become aware of the service, they must be convinced that it is a superior option for them, and they must determine that it satisfies their particular trip needs. Only then will they try it. Once they use the new system, their perceptions of it may be altered and their future behavior (e.g., repeat or not) will depend upon their experience. That is, the consumer response process is not a simple one step process, but rather a complex series of stages. The better a manager or planner understands this process, the better they can design and implement service changes. The consumer-oriented approach consists of three phases; design, implementation and monitoring; which represent chronological steps in the evolution of a service strategy and fare structure based on analysis of consumer responses to alternative transportation services. See Figure 1.

The design phase begins with qualitative studies which identify opportunities for service improvement, identify design characteristics which are important to the consumer, and give the manager and planner a basic understanding of the riding public. Qualitative studies are a necessary first step but innovation requires models and measures which can help the manager make specific decisions. Thus the design phase next provides quantified diagnostic information on market structure, consumer desires, and segmentation. This diagnostic information tells the manager which service attributes to concentrate on, what tradeoffs to make in the design of service, and how to set varied service strategy for segments of the public. Even with the best design the manager must make an initial GO/NO GO decision on implementation. The final step in the design phase is to predict consumer response to the proposed changes.

The design phase leads to the development of a superior service for the needs of the target population and a better estimate of expected performance. The next phase, implementation, establishes the advertising and promotion strategy and measures consumer reaction to the service innovation. The advertising and promotion strategy is designed to make consumers aware of the system and induce them to try it. Measures of consumer awareness, availability, initial trial, repeat usage, and satisfaction allow the manager to control the implementation and to immediately identify when consumer responses differ substantially from those predicted. This information enables the operator to respond quickly to improve his service or marketing mix. This process helps insure that innovations will meet their stated objectives.

The final phase in the process is monitoring service operations and traveler responses on a continuing basis. Once ridership has fully responded to changes, the intensive consumer measurement of the implementation phase is no longer necessary. This does not mean that the operator can ignore consumer behavior. The consumer-oriented marketing approach continues to monitor consumer behavior so that the transit manager can stay in touch with the changing needs and desires of the riding public. This will maintain a quality service with sufficient patronage.

The remainder of the paper develops these basic concepts with discussions of the managerial issues. Simple examples are given to illustrate the concepts. Readers are directed to the technical references for details and more complete examples.

3. THE DESIGN PHASE

The purpose of the design phase is to develop transportation service in-

INTEGRATED MARKETING APPROACH TO TRANSPORTATION SERVICE

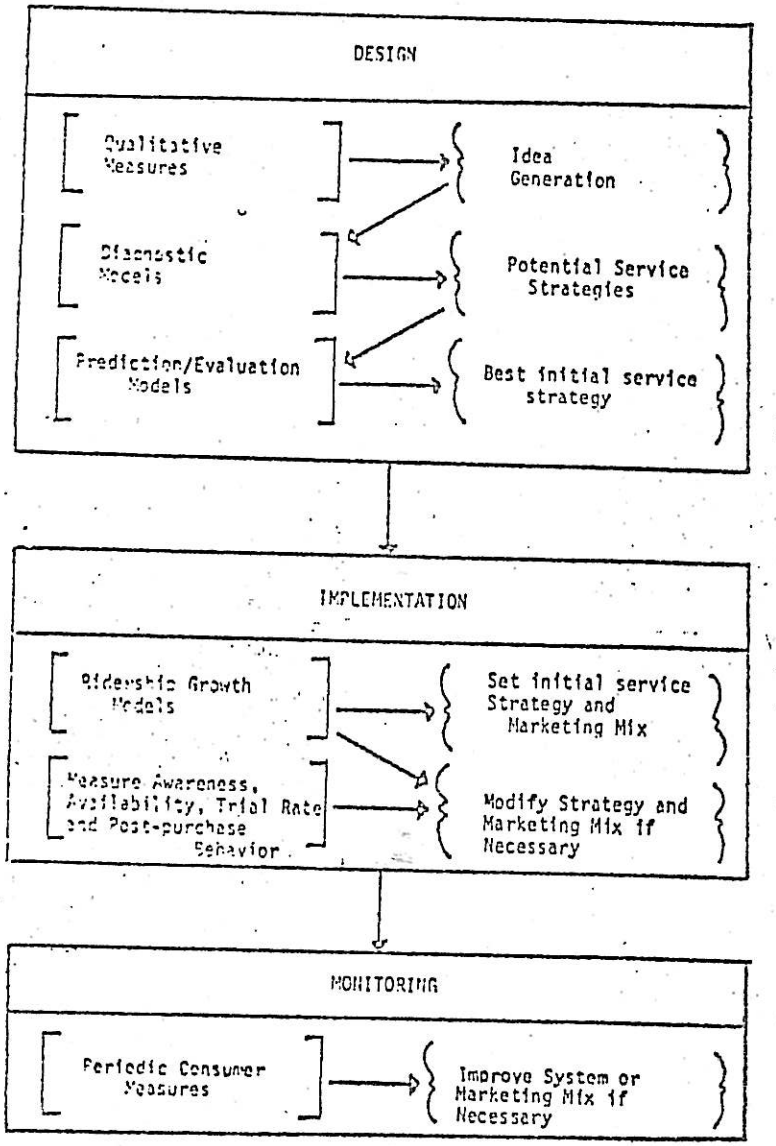

FIGURE 1

novations which satisfy community objectives such as increasing revenues by increasing ridership. In other cases, a wider range of objectives such as provision of service to special groups or reduction in road congestion, fuel consumption, and air pollution may be relevant. To design such service strategies, a transportation operator must have an understanding of how consumers respond to transportation service characteristics. Figure 2, adapted from models in marketing and in transportation [15, 19, 34], describes this consumer response process, the boxes represent elements of consumer response including how they acquire information, form perceptions, evaluate service, make transportation choices, and acquire improved information by experience. The circles represent measuable characteristics of the transportation service, advertising, and promotion and public image of the transportation system. Other important measures include individual perceptions of service, tastes, goodness ratings, service availability for trip needs, and choice.

To better understand Figure 2, imagine that a community introduces a new bus route connecting your neighborhood to the downtown area. The transit company sets the system characteristics (circle 1) and advertising, promotion, etc. (circle 2). You hear about the service by radio, newspaper, brochure, or by word-of-mouth (box A). You now have information about the service (circle 3) and form perceptions (box B) of the attributes (comfort, travel

CONSUMER RESPONSE PROCESS

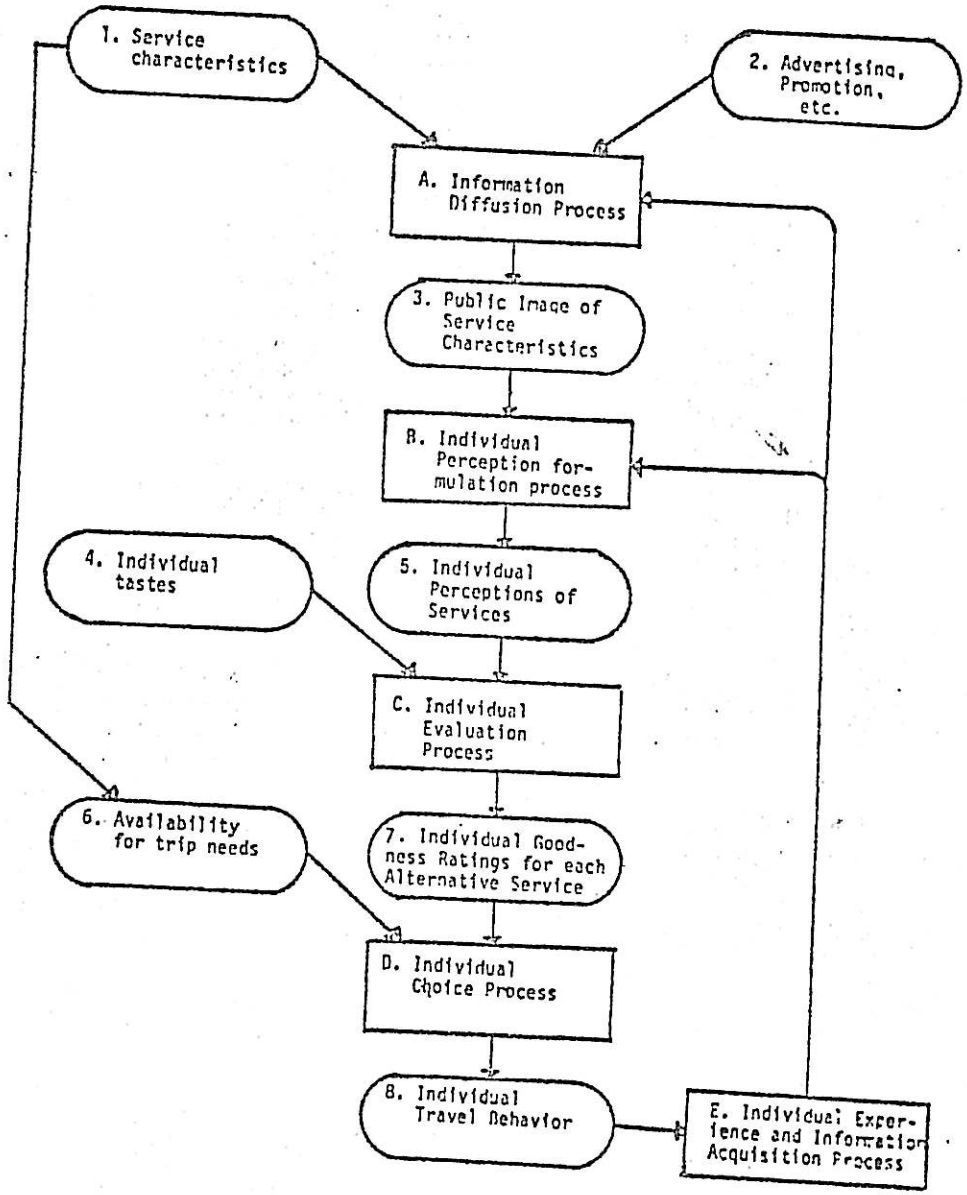

FIGURE 2

time, safety, cost) of the service. You consider other alternatives such as auto or bicycle and evaluate them (box C) based on your personal tastes (circle 4). (For example, do you want a fast but expensive service or a slow inexpensive one.) Then if the route serves your particular trip needs (circle 6) you might choose it for your next trip downtown (box D). Finally, the experience improves your information about the system (box E) and feeds back to influence each aspect of your choice process.

Each step is modeled separately because each step provides important information to the transportation manager, and because service and marketing strategies can be designed to influence each step. For example, it is important for a manager to know what dimensions, e.g., reliability, influence consumers' evaluations of transportation systems. Furthermore, it is important to measure how consumers perceive each existing or potential system relative to these dimensions and to know how these dimensions influence consumer behavior. Armed with this information a manager can select those system or marketing strategies that best serve consumers. Finally, predictions of consumer behavior coupled with cost considerations enable managers to evaluate strategies and choose the strategy which best fulfills their managerial goals.

Thus the design process is a set of consumer measurements and consumer models that give managers the marketing information to make strategic decisions. In particular, the design process gives outputs in the form of measures of public image, consumer perceptions, and preferences by consumer segment (circle 3, 4, 5, and 7) and predictions of consumer choice behavior (circle 6 and 8).

Public Image

There are both quantifiable (survey) and qualitative measures of public image. The qualitative studies provide a necessary subjective input to identify issues and to look at the service through the eyes of the consumer. Focus groups [24, 29] have proven particularly efficient and useful for qualitative studies. Focus groups are groups of 6-8 consumers brought together and encouraged by a moderator to discuss their attitudes toward existing transportation alternatives and to indicate how they now make choices. Group dynamics become important and skillful moderation is essential. In addition to focus groups, questionnaires requiring open-ended responses, intercept interviews, citizens groups, and library research to uncover past studies are useful qualitative techniques. These techniques are limited only by time, cost, and imagination.

In interpreting these studies, managers must recognize that these qualitative measures are not from a representative sample and tend to favor the more outspoken and articulate consumers. The emphasis of the qualitative analysis is on breadth of ideas and identification of important attributes. These are then quantitatively analyzed in the next step of the design phase. An important output of the qualitative analysis is a set of questions which can be used to measure the attributes relevant to the consumers' choices. These attributes, or image measures, are then quantified through consumer surveys [37, 38]. For example, Figure 3 is a comparative "map" of consumers' images of four shopping centers in the Chicago area.

Consumer Perceptions

Image "maps" such as Figure 3 are useful to describe how consumers view detailed aspects of a transportation related service, but for designing systems it is hard to get clear insights from so much complex information. Thus to understand the true perceptual process, to gain managerial insight, and to enhance creative strategy development, the design phase uses models to identify the cognitive structure of consumer perceptions. These perceptual models either reduce the set of attributes through factor analysis [43], discriminant ability [23, 39], or they independently uncover the dimensions based on measures of dissimilarity [12]. Of these models, factor analysis seems to predict best and cost the least to use [17].

For example, the factor loadings matrix in Figure 4 indicates that there are four basic factors underlying perceptions of shopping centers: variety, shopping satisfaction, price/value, and parking. Variety includes variety of stores, variety of merchandise, and the availability of specific stores. Shopping satisfaction includes ease of purchasing (layout, return and service, courteous sales assistants), atmosphere, quality of merchandise, and prestige of store. Price/value includes reasonable price, specials, credit, and to some extent ease of returning. Finally, parking includes availability, parking cost, and layout of the shopping center. The factor analysis also produces measures of how each consumer perceives each transportation alternative on the factors. Figure 5

AVERAGE RATINGS FOR FOUR SHOPPING CENTERS ON THE UNDERLYING PERCEPTUAL SCALES

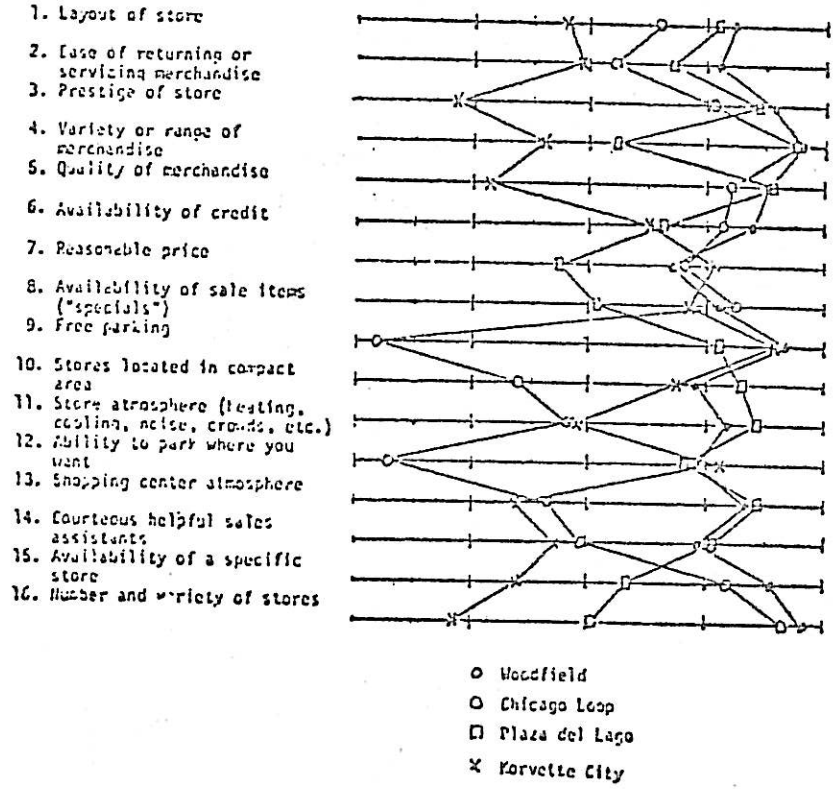

FIGURE 3

gives average perceptions for the same four shopping centers mapped in Figure 3. Maps such as Figure 5 provide managers with insight on how their services are perceived relative to their competitors. Gaps in the market as well as their service's strengths and weaknesses can be readily identified from these maps. For example, Plaza del Lago is a North Shore prestige shopping center with Spanish architecture and exclusive stores. As expected, our map shows that it is enjoyable to shop there but variety and value are better at other locations.

Preference Models

The perceptual maps identify market structure but they do not describe the relative importances of the perceptual factors in the consumer's evaluation process. Joint analysis of preference rankings and perceptions (both collected in a mailed survey) identifies the effect that each perceptual factor has in the consumer's evaluation process. There are a number of methods available to accomplish this task including preference regression [46], expectancy value [10, 42], direct consumer utility assessment [20], trade-off analysis [22], conjoint analysis [13], and logit analysis [40]. These models share the common property that they represent the evaluation of an alternative as a function of the perceptions of the factors. They produce scalar goodness ratings (circle 7 in Figure 2), representing each consumer's evaluation of each transportation alternative. Many of these models identify weights which indicate to managers the relative importances of the perceptual dimensions. These weights indicate which attributes should be improved to obtain maximum consumer impact. For example, suppose the importance weight for reliability is significantly larger than the importance weight for comfort. If the costs of improving reliability and comfort are

FACTOR LOADINGS FOR PERCEPTION OF SHOPPING CENTERS

	VARIETY	SHOPPING SATISFACTION	PARKING	PRICE/VALUE
Layout of store	.267	.583	.200	.156
Return and service	.095	.520	.255	.343
Prestige of store	.338	.822	-.058	-.001
Variety of merchandise	.665	.327	-.185	.309
Quality of merchandise	.307	.810	-.074	.037
Availability of credit	.159	.337	.049	.487
Reasonable price	.067	-.063	.113	.599
"Specials"	.223	.074	.008	.739
Free parking	-.150	.068	.811	.043
Center layout	.030	.308	.560	.074
Store atmosphere	.080	.659	.400	.034
Parking available	.145	.105	.841	.108
Center atmosphere	.244	.694	.404	-.040
Sales assistants	.173	.560	.319	.147
Store availability	.619	.320	.034	.204
Variety of stores	.829	.268	-.173	.160

FIGURE 4

AVERAGE PERCEPTIONS ON REDUCED DIMENSIONS

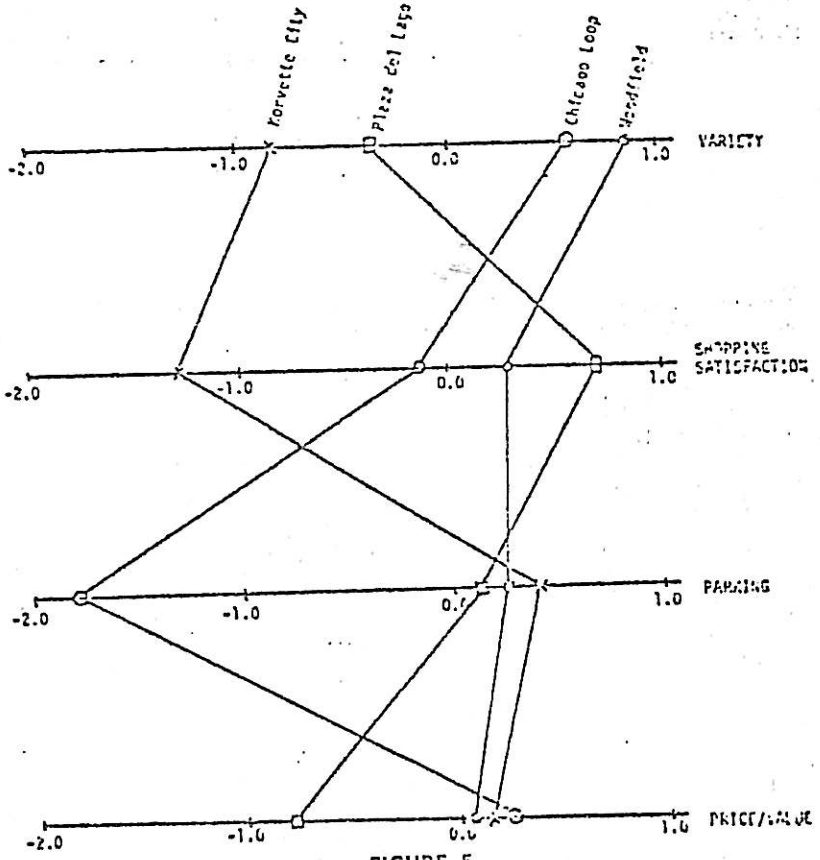

FIGURE 5

equal, the manager should concentrate on improving reliability.

Empirical tests [4, 17, 28] have shown many preference models to be robust in that they give comparable predictions or importance weights. For example, both preference regression and logit analysis select satisfaction as the most important perceptual dimension and parking as the least important dimension in Figure 5 [17]. (Actual normalized weights for logit are variety, .38, satisfaction, .54, parking, .01, and price/value, .07.) These weights partially explain why Woodfield has the major share of preference even though Korvette City is slightly superior in both parking and price/value.

Segmentation

Different individuals have different preferences for transportation attributes. Some people favor fast, reliable, premium service over low cost adequate service, while others favor the low cost service over the premium service. Merging these groups may lead to estimated importances which imply equal tradeoffs between speed and reliability versus cost. A service designed to satisfy the "average" consumers may actually satisfy none of the consumers. Thus, we must identify market preference segments whenever they exist. Most classification schemes for mode preference have been based on socioeconomic characteristics, trip purpose, or prior transportation behavior [11, 49] or based on multiple dimensions including socioeconomic and travel characteristics [33].

Each of these schemes serves a valid purpose because each acts as a proxy for segmentation by preferences. For example, age is often suggested because most analysts feel that the young have different preferences from the elderly. An improved technique for segmentation is benefit segmentation [14, 19]. Benefit segmentation is operationalized by first searching for segments by prior beliefs (such as age) or by more sophisticated search procedures and then testing these segments to see if the segments really capture differences in preference. The criteria for the tests are (1) significantly different importance weights between segments and (2) significantly better explanatory power when the segments are used. Alternatively, some models such as direct utility assessment, conjoint analysis, and expectancy value produce importance weights for each individual. In this case the best segmentation approach is to identify segments by these weights without regard to demographics or travel characteristics [6, 7, 19].

Identification of these preference groups is essential to the development of improved service strategies. This information is useful even if it is not possible to put demographic labels on the different groups. For example, in considering the adoption of a proposed dial-a-ride service, it is important to know that there are distinct groups in the population who cannot readily afford taxi fares but are prepared to pay a moderate premium over normal bus fares for door-to-door service. It is important to do this even if it is not possible to identify these groups in terms of their demographic or travel characteristics.

Together the perceptual, preference, and segmentation models provide key diagnostic information to the manager. This information helps him identify high potential opportunities and design consumer - oriented transportation service. But before he can select a best initial design, he needs to predict how many consumers will actually use the system he plans to implement.

Choice Models and Prediction Process

Use of new transportation alternatives results from choice decisions by numerous consumers acting independently [25]. Each consumer decides whether or not to use the proposed service for a particular trip based on its availability for that trip and its preference rating compared to other available alternatives. If the individual's goodness ratings are known without error, his predicted choice is the available alternative with the highest preference rating. In practice, we do not know preference ratings with certainty. We can only predict the probability that the individual will choose each available alternative [5, 36]. These predictions differ from those used in the standard planning approach by the inclusion of individual perceptions of underlying cognitive factors in addition to or in place of objective measures of service characteristics. We evaluate a choice model in terms of its ability to explain observed choice behavior in the sample population. For example, on "saved data" the models discussed earlier could correctly predict 55% of consumer preferences and 32% of the "information" in choice behavior [16, 17, 28]. Although far from perfect these individual predictions aggregate to predict market shares within a few percentage points. These predictions are then sufficient to decide among alternative design strategies.

To predict system usage we must link the sequence of models (public image, perceptions, preference, segmentation, and choice) together to obtain estimates of changes in ridership based on changes in service characteristics. Although the model structure is based on analysis of individual behavior, the system operator needs aggregate predictions of ridership. Aggregate predictions are made by simply adding together individual predictions within the sample and projecting these to the entire population [27].

But how are individual predictions made? Predictions of changes in behavior must be based on changes in design characteristics and their expected influence on consumer perceptions. Consumer perceptions of the underlying factors for a new alternative may be obtained by (1) remeasurement, (2) linkage from underlying attributes and (3) operator judgment. Remeasurement presents a sample of consumers with a description of the new service (ranging from written descriptions to trial usage), and obtaining ratings of the new service with respect to the same attributes used in developing the original perception models. Linkage to underlying attributes is based on estimating changes in individual attributes and calculating their effect on factor scores using factor score coefficients [43]. Finally, perception values may be obtained by judgmentally comparing the proposed alternatives to existing alternatives. In this case, factor scores which apply to each new alternative are judgmentally estimated. Once factor scores have been estimated prediction follows by direct substitution in the preference, choice models, and aggregation models.

Based on these predictions an initial design strategy is selected for implementation. This design strategy will be the one which most nearly meets the objectives of the operator.

4. IMPLEMENTATION OF SERVICE STRATEGY AND MARKETING MIX

The design phase examined consumer needs and desires to produce a best initial service strategy and fare structure. Because this strategy responds to consumer perceptions and preferences, it has a high probability of success. The implementation phase sets advertising, promotion, and timing of the service changes to best achieve this success. It monitors changes in travel to insure that the implementation proceeds in the best possible way. A single model sets the initial marketing strategy and monitors the introduction of the service innovation. The model sets the initial marketing strategy based on preliminary estimates of the various components of the consumer behavioral process. As the service is introduced periodic measures are made and compared to the planned strategy. The measures are selected so that they immediately indicate when it is necessary to modify the marketing mix or the service strategy.

Issues and Measures

It is important to monitor response to transportation changes. This can be done by making periodic measures of ridership. See Figure 6a. These measures are important, but they are not enough! To make effective decisions to control demand the manager must know what is causing the build-up of demand. This is best illustrated with two scenarios.

First (scenario 1), suppose a system has moderate but effective advertising and promotion. Each month more people become aware of the service and many of these people are induced to try it. Suppose further that the service effectively meets their needs and 90% of those who try it become repeat riders. Alternatively (scenario 2), suppose a system has a heavy advertising and promotion campaign which has reached almost all potential riders within six months, and each month more people are induced to try the new service. Suppose further the system does not live up to its expectations and very few people become repeat riders.

Both situations might result in the initial ridership growth shown in Figure 6a. But, it is important to know which is the true scenario. Although ridership is increasing in both scenarios, they are dramatically different if the change in ridership is extrapolated. In the first case ridership may be expected to change as shown in Figure 6b. Growth will gradually continue until the market has been fully exposed and a stable ridership is established. In the second case, ridership will drop off as shown in Figure 6c as full awareness is achieved and a large proportion of the initial riders fail to repeat. It is important for the operator to know which situation exists in his market. In the first scenario, he may be satisfied to make no changes or he may try to increase trial usage by some type of rider promotion scheme (free coupon, free return trip, etc.). In the second scenario, he must identify methods to improve the service.

As a further illustration, suppose the operator has been advised to begin a heavy advertising and promotion scheme. The likely effects are shown in Figures

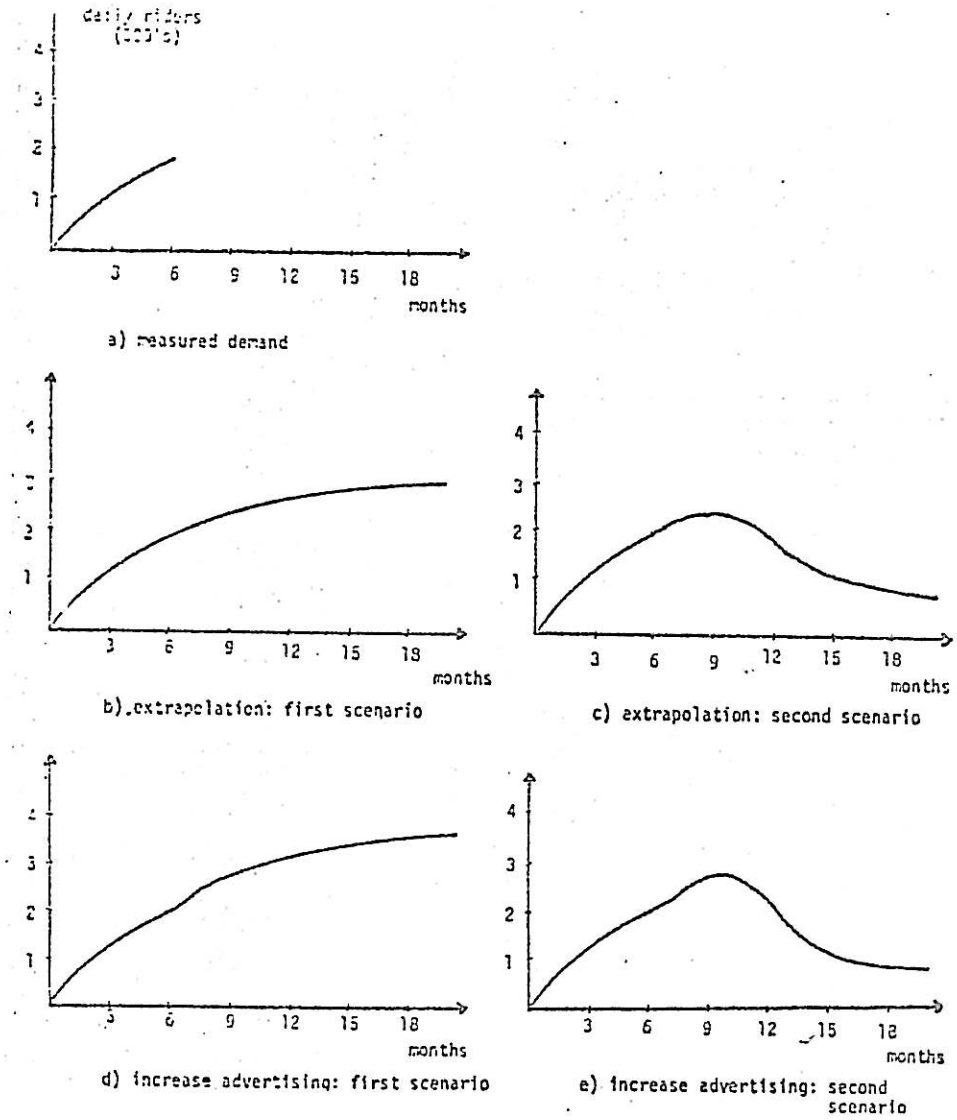

FIGURE 6

6d and 6e. Under scenario one, new trial riders are obtained at a slightly faster rate, but continue to use the system. Under scenario two, new trial riders are obtained at a slightly faster rate, but do not continue to use the system. If the first scenario was the true case, the operator was well advised because long term ridership increased. If the second scenario was the true case, he was ill-advised because long term ridership remained unaffected.

The above example represents the effects that are well documented in new product and service introduction [44, 47]. The example illustrates that each component in the service strategy and marketing mix has a purpose and that a service introduction will be successful only if each component performs its function as planned. In the implementation phase of the marketing approach a manager can measure the effectiveness of each component by monitoring vari-

ous behavioral steps in the consumer response process. The entire consumer process is linked together with a model which can extrapolate trends as shown in Figures 6b and 6c and predict the impact of changes in service or in the marketing mix as shown in Figures 6d and 6e.

Macro-Flow Model

There are numerous models in marketing to monitor and predict the dynamic effects of new product or service introduction. Among these are microanalytic simulation [1, 21], diffusion equations [3, 8, 15, 35], and macro-flow models [47]. Of these, the most practical is the macro-flow model which uses a level of detail consistent with consumer behavioral theory but measurable in terms of strategic managerial decisions [47]. In transportation, this represents an extension of existing models [15] from a theoretical development to a practical implementation based on measurable characteristics.

The macro-flow concept presents a picture of the consumer response to changes in service and associated advertising and promotion. It identifies the behavioral states a consumer passes through as he becomes aware of the service, tries the service, and perhaps becomes a repeat rider. Based on ridership counts, monthly onboard surveys, and monthly short telephone interviews it measures how many consumers are in each behavioral state and monitors their "flows" from state to state. For example, each month a manager can monitor (1) how many consumers saw the advertising, (2) how many of these felt the service might satisfy their travel needs, (3) how many no longer ride because the service does not live up to their expectations, and (4) how many no longer ride because the service is unreliable. Although a fully detailed macroflow model may contain many possible states [47], the manager can choose to measure only those states which are important to his product strategy. The consumer states to be measured are selected based on the manager's goals and strategy. They are specifically chosen to measure the underlying effect of the service strategy and marketing mix for the particular implementation under study.

For example, consider the introduction of a new dial-a-ride service in a small urban community. The service will begin in the southeast section of the community and later expand to other sections. It will provide door-to-door service with maximum waiting time of 15 minutes and maximum travel time 1½ times that for conventional taxi. Advertising will be on the radio and in the newspaper and promotion will consist of free passes mailed to 30% of the community. Figure 7 is one possible macroflow model for this service introduction. At first glance the model appears rather complex. However, careful inspection reveals that at any given time a consumer can be in only one of the states and further he could only have gotten there by "flowing" through the preceding states as indicated by the arrows. Thus, the measurement task is to find out which state each of the sampled consumers are in now and were in since the previous sampling period. This model is not built for each and every consumer, but is rather a summary representation of the consumer behavioral states relevant to service introduction.

To use this model the manager constructs a monthly telephone survey to determine which behavioral state each sampled consumer is in now and was in since the last calling period [47]. The manager then projects the sample to the population and compares the empirical measures to his expectations. Since these measures also give him flow rates (e.g., rate at which people become aware, try, etc.) he can extrapolate the trends to future months as was done in Figures 6b and 6c.

To simulate strategy improvements and to pretest the initial marketing mix, past experience and statistical models are used to link various managerial strategies to flows in the macro-flow model. In the simple example, one could use the media budget and measures of copy effectiveness to estimate exposure to newspaper and radio and the effectiveness of that exposure in creating awareness [30, 32, 47]. The predictive models developed in the design phase are used to estimate trial given awareness. Once the predictive models are calibrated, they are used to evaluate an initial strategy so that the most promising can be chosen. As the implementation proceeds the measures and models become more accurate and the strategy is updated as necessary.

In summary, the macro-flow model in the implementation phase provides the manager with detailed information which can be used to select and improve his service strategy (service offerings and fare structure initially set in the design phase), his promotional strategy (advertising budget and copy, price off promotions, coupons, special services), and his service expansion (the order and timing of new routes or service regions). The model makes maximum use of the available information to enable the manager to select the best initial strategy

EXAMPLE OF A MACRO-FLOW MODEL

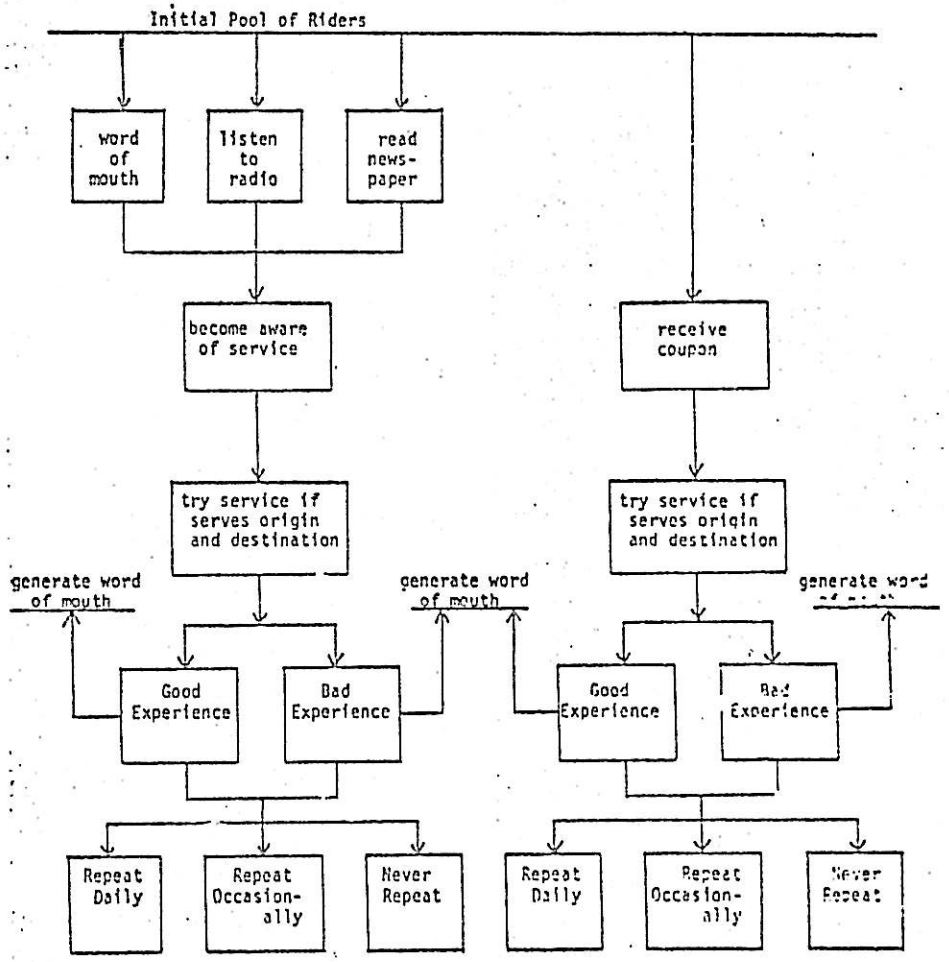

FIGURE 7

and to respond quickly if problems occur in the service introduction. The implementation measures are continued until the flows in the consumer response model stabilize.

5. MONITORING THE CONSUMER PROCESS INSURES CONTINUED SUCCESS

The design of the service and marketing strategy for the public transportation service is not a one-time process. The manager is continually faced with changes in the population, changes in tastes or preferences for different types of service, changes in development and land-use patterns, changes in social values, changes in public objectives for providing service, and changes in the characteristics of alternative services. A successful transportation service must continually respond to these changes. The monitoring process identifies these changes as they occur and indicates when it is important to consider changes in the marketing service strategy. The basic function of the monitoring process is to consider each of these potential changes so that diagnostics can be developed which suggest the appropriate changes in the transportation service. In effect, the monitoring process is one of maintaining continuing awareness of the needs of the consuming public for transportation service and responding with

new or revised service strategies to satisfy these needs.

The models necessary for monitoring need not be as complex as those used in design or implementation. Rather the manager should consider occasional (e.g., every 4 to 6 months) sampling of his riders and potential riders to discover if their behavior has begun to change. For example, if the repeat rate in the final stages of implementation drops from 90% to 70% he should investigate the cause. Perhaps the level of service has dropped, or perhaps a new competitive service has entered the market, or perhaps consumer tastes have changed. To find out which, the manager may have to reenter either the design phase or the implementation phase and adjust those models to the new situation. There are formal models for monitoring [30, 31]. These models have been extremely successful in consumer products. It is reasonable to posit that similar models [18] will enjoy the same success in transportation services.

6. DISCUSSION AND SUMMARY

The success of transportation innovations depends on consumer response. To insure success, transportation innovation must be carefully designed to satisfy consumer needs and must be implemented with a carefully executed marketing strategy.

The first phase of the marketing approach helps the manager design his initial service strategy. It gives him diagnostic information to help him understand the consumers and predictions of ridership to help him evaluate potential strategies. The second phase of the marketing approach provides information to help the manager select his marketing mix (advertising, promotion, fare, etc.) and implement the service strategy. These models and measures monitor the dynamic build-up of ridership and provide immediate feedback on the implementation. With these models the manager reacts by continually modifying his strategy to insure that his goals are optimally achieved. The final phase of the marketing approach keeps the manager in touch with his riding public and his operating environment so that he can maintain a quality service.

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