Long-Range Versus Short-Range Research Program Planning

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This paper discusses the difference between short-range research (1-5 year implementation period) and long-range research (10-20 years into the future) and points out the critical lack of long-range transportation research. Past eras of urban transportation are identified and discussed, including (a) "introduction of the automobile" era, (b) "getting out of the mud" era, (c) "freeway" era, and (d) "transportation system management" era. The trend to a "regulation" era due to a lack of long-range research and specific directions for our national transportation program is emphasized. The need to develop a new methodology for long-range transportation research is pointed out along with the need for the development of transportation futurists. A suggested framework for the needed methodology is presented and a plea is made for the critical national need to embark on an effective long-range research program in transportation.

The opportunity to discuss the subject of long-range versus short-range research presents a very interesting and challenging problem. Before getting down to specifics, I wish to first develop the framework within which this paper was developed and to present some basic definitions.

First, the background. The title of this session is "Research Program Planning to Maximize Effectiveness," and the paper is developed within this context. It further assumes that the research program that we are planning is a rather substantial program such as would be found at a state or national level. A state program might be one for the transportation department of the state, and a national program might, for example, be that of the U.S. Department of Transportation.

I suspect that the terms short-range and long-range research register a variety of meanings for anyone who encounters them. Thus, I will define these terms according to my concept of what they mean.

SHORT-RANGE RESEARCH

Short-range research is research that addresses a specific, well-defined problem and that can normally be completed in a one-to-five-year period. The results of short-range research can be evaluated (i.e., workable solutions to the problem were obtained (or not obtained)). The results can usually be transferred into specific actions and implemented rather rapidly. An example of a short-range research project might be the elimination of fixed-object hazards such as large sign structures or illumination poles. This problem surfaced after a substantial amount of the Interstate system was built record mileages of streets and freeways. The end of World War II ushered in the freeway era. This era brought the trend to suburban living, the two- and three-car family, and the rapid upward acceleration of the vehicle ownership curve. A 45 000-mile Interstate system was constructed, and almost all our cities have reached a point in time when it has become imperative that we implement a rather large and effective long-range research program.

PERSONAL TRANSPORTATION ERAS

In order to justify this critical need, let me briefly focus on the status of personal transportation as I see the situation. I feel this will make an effective case for the research needs I have emphasized.

The personal transportation area has evolved through a number of eras. These could be identified as follows:

1. Early 1900s -- "introduction of the automobile" era;
2. 1920-1940s -- "getting out of the mud" era;
3. 1940s-1960s -- "freeway" era, development of the Interstate system and urban freeway networks; and
4. 1960 to present -- "transportation system management (TSM)" era.

The private automobile came into use in the early 1900s, and its popularity grew very rapidly. During the period 1920-1940, we were mainly concerned with the development of a minimum national system of streets and highways. The end of World War II ushered in the freeway era. This era brought the trend to suburban living, the two- and three-car family, and the rapid upward acceleration of the vehicle ownership curve. A 45,000-mile Interstate system was constructed, and almost all our cities built record mileages of streets and freeways.

The freeway era continued into the late 1960s, when a significant change began to occur. Inflation caused road construction costs to double and triple, and the national concern for growing environmental problems combined with these increased costs to reduce construction programs to almost a standstill. We thus entered the TSM era, where we have concentrated efforts toward making the best use of the existing facilities.

The TSM approach has merit. We have been wasteful and somewhat narrow-minded in our views, and it is well to concentrate on the means to make more effective use of existing facilities. This approach requires one to consider the impact of economics,
Edward Cornish, president of the World Future Society, in a presentation to the First International Future Research Conference held in Oslo in 1967 (1), outlined the framework of a methodology that could be used both for long-range transportation forecasting. Cornish points out that one cannot study the future because one cannot study what does not exist but rather, one must study futuribles (or alternative futures), which are statements of what may come to pass in an unknown future.

A basic methodology for long-range research was outlined by Cornish as follows:

1. Generation of futuribles—Asking and answering the question, What might happen in the future? This task could range from fantasy to conservative projections of past trends.

2. Assessment of futuribles—Once a futurible has been generated, it can be studied. A critical step would be to estimate the probability that a given futurible would happen. The probability of the futurible occurring might range from 1 to 99 percent.

3. Evaluation of futuribles—Once pertinent futuribles are defined that have a reasonable probability of occurring, then one can ask the question, How will this futurible affect us if it occurs?

As an example, consider a long-range study to evaluate personal transportation in the year 2000. One futurible that could be generated would be one that envisions a technological breakthrough on a new source of power for the small automobile. Assume that a 75 percent probability of this happening was estimated. Then one could evaluate a future urban scenario (with a high probability of occurrence) that provides for continued availability of the private automobile.

SUMMARY AND CONCLUSIONS

The process of generating, assessing, and evaluating futuribles is but a part of the overall long-range research needed in transportation. We must also be able to take the results of the process and translate them into specific policies and goals. Without this last step, we are no better off than we are at the present. Thus, basic considerations of the social, economic, and political environment must also be taken into account.

A significant parallel exists between the present energy situation and urban transportation. It was possible in the late 1950s or early 1960s for professionals in the energy field to project and evaluate a futurible that would closely match our present situation. We can, in fact, find papers and reports from the past that rather clearly illuminate the present energy situation.

The sad fact, however, is that the energy professionals did not have the capability to influence public policy and cause national goals to be set that could have made major impacts on avoiding the crisis in 1979. From the urban transportation viewpoint, we have the same problem, opportunity, and challenge. We must be able to go beyond just long-range planning and forecasting. We must develop a methodology and means for implementing our research findings. The long-range research must be done in such a manner that it can impact public policy and overcome the social, political, and economic forces that are retarding progress so effectively today.

In summary, let me define some specific steps that I think those of us in the field of transportation research must recognize and support. These are as follows:

1. Develop a methodology and means for implementing research findings.

2. Go beyond just long-range planning and forecasting.

3. Impact public policy to overcome social, political, and economic forces.
Basic Versus Applied Research: How to Maximize Effectiveness

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A dilemma has existed regarding basic and applied research. The characterization of this dilemma is noted by the competitive environment in which these modes of research are carried out. Basic and applied research are important and must take place in a supportive environment. Adequate funding for each is necessary to maximize effectiveness and to facilitate growth in knowledge and in application of knowledge. The nature and development of research are traced to modern times and conclusions are drawn as to the need to maximize research effectiveness for basic and applied research.

Traditionally, research has been contrasted by two approaches: fundamental or basic research, which is carried on without regard to the immediate utility of the outcomes, and applied or industrial research, which is directed toward the solution of specific problems. These definitions carefully delineate the environment in which a particular research thrust is developed and provide an implicit statement about the funding for research.

In this paper, the thesis will be advanced that, in order to maximize the effectiveness of research, whether basic or applied, it will be necessary to understand the issues that surround the topic, review policy perspectives for future research work, understand the political funding environment, and develop national priorities related to the utility of research outcomes.

The support of research, basic and applied, is essential to the development and advancement of concepts and ideas. Creativity is enhanced by research. Conceptualization, idea development, and creativity are essential for the continued positive evolution of mankind. In our time, the nature of research and the uneven record of benefit to mankind has come under minute scrutiny (1). To maximize the effectiveness of research efforts, we must restore public confidence.

HISTORICAL OVERVIEW

Research, as we know it today, is a relatively modern development that comes as late as the onset

REFERENCES