

Public Policy Development: The Matrix for Decision Making

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On issues in the public domain, decisions on programs and resource allocation are the responsibility of political actors. That is, any allocation of public resources is determined on the basis of a social judgment about the priority needs of that society and the acceptability of the means and level of investment required to satisfy those needs. In the United States at least, the responsibility for such social judgments is delegated to elected officials or those appointed by them.

Because most public policy issues involve technologies of varying levels of sophistication, the decision process is usually compromised in two important ways. One is that, outside of a few areas, technology has neither been viewed nor used as an explicit instrument of public policy. The other is that policy making is based on inadequate information whose direct and indirect impacts and long-term and short-term effects on the society have been inadequately evaluated.

The first problem essentially leads to the use of existing technologies rather than to considerations of new alternatives. The result is that technologies are expanded beyond the limits of their utility, which produces wholly unexpected and often undesirable side effects. Many examples of this in this century are well documented (2).

The second consideration of information and evaluation is a technical problem. But it is a problem of providing that analysis in terms that have utility to policy makers and that are adapted to their decision-making process and value system. This involves at least three crucial dimensions:

1. Evaluation of alternatives in a cost-effectiveness or comparative framework including indirect as well as direct effects;
2. Evaluation of the temporal framework within which policy alternatives will produce benefits to the society, i.e., the social rate of return to the society; and
3. Evaluation of acceptability of the alternatives as a social and political policy.

The first dimension involves a framework for identifying alternative means to achieve a policy goal and should include social, legal, and technological means. However,

aside from comprehensiveness in identifying the alternatives, the problem is one of finding a common metric that is acceptable to policy makers and that they feel confident in using. This has been discussed at length by Baker, Michaels, and Preston (1), who hypothesized that a subjective metric meets these criteria. In addition, they suggested that a dollar metric treated as a measure of perceived value is an obvious candidate. Hence, if a matrix of policy alternatives and their direct and indirect effects can be constructed in which the cells contain an equivalent dollar value, the result will be a cost-effectiveness matrix whose marginals define the relative net costs of the alternatives. Baker, Michaels, and Preston developed such a model in detail.

The second dimension is essentially to derive a social time rate of return for the alternatives evaluated. Based on reasonable estimates for creating, producing, and implementing the alternative set, it is possible to estimate the social return, if any, in dollars that will accrue to the public and when. This is quite similar to conventional investment analysis except that it can be quite a bit simpler. It hinges on the availability of the cost-effectiveness matrix because it provides the total social return on each policy alternative.

The third dimension is quite different from the previous two. When we talk about acceptability we are involved in a wholly subjective domain. Policy makers, in general, make decisions under uncertain conditions, and in one domain there is very high uncertainty indeed: Will any decision on a policy alternative be acceptable to the society? If it is not, the policy will never be implemented or, if implemented, will not be used by the people for whom it has been developed. Experiences in urban transport and public housing policy during the last decade are examples of how basic the issue of social acceptability is. This is, of course, a political problem but fundamentally a subjective one and one that must be dealt with at the subjective level. Doing so is an integral part of the policy process and no less important than so-called objective analyses.

This paper is concerned with policy analysis and largely with the social acceptability dimension. Further, it focuses on a specific policy issue: energy conservation in urban transportation. The purpose is to

examine the implications of the more subjective considerations in policy development and to suggest a means for including these dimensions in the larger policy development process.

EVALUATION OF POLICY ALTERNATIVES

Since the so-called Paley report, it has been well-known that the United States would become a net importer of petroleum between 1970 and 1985 depending on the rate of growth of petroleum usage. There are a variety of ways to avoid or reduce dependence on external sources. One obvious approach is to initiate programs and policies that reduce use in existing consuming systems. The concern in this paper is with oil conservation, specifically in urban transportation.

After the policy analysis process described, the following realistic set of possible alternative means of conserving energy in urban transportation was identified:

1. Institutional rearrangements—land use, regional public transit;
2. Legal sanctions—speed limits, rationing;
3. Economic rewards—gas taxes, horsepower taxes;
4. Value changes—change in preference for automobile to that for public transit, car pooling to reduce travel, curtailment of travel; and
5. Technological advances—new power source, personal rapid transit (PRT), substitution of communication for travel, smaller vehicles.

These alternatives were first rated in terms of their direct and indirect effects. This was done as a simple seven-point rating scale on each of 12 criterion dimensions. It was concluded that seven of these policy alternatives were significantly more effective than the others (Table 1).

✓ The next stage in the analysis was to develop the net dollar costs, direct and indirect, for each of these seven policy alternatives. This was done by using the method described earlier. Note that energy savings are actually an indirect effect of implementing a transport policy. Although all seven alternatives provide a substantial savings of oil, five produce a net social benefit and two produce a net social cost.

• The second consideration from a policy standpoint is estimating the rate of social return. Basically, this can be done by determining how long it will take from initiation of a policy to its nationwide implementation. These functions were estimated for the seven alternatives and are shown in Figure 1. If extensive research and development are involved or if there are other delays to implementation, the rate of return function shows a net and increasing cost over that initial time period. It is not until these functions cross zero that a net social return accrues. If the alternative produces a social benefit, then ultimately the net return will attain a zero cost, and this crossover point defines an expected time to recovery of the social investment. Clearly, for policy alternatives that produce a net cost, the social return function will produce an accumulating positive cost to the society.

SUBJECTIVE EVALUATION OF POLICY ALTERNATIVES

The third element of policy analysis is the acceptability of the alternative means to attain a social goal. The policy maker must have some insight into whether the society will permit implementation of the alternative or

whether the alternative if implemented will be used in the way the policy proposes. This issue is of equal importance to the other two phases of policy analysis. The history of public policy in this century has demonstrated this fact repeatedly.

Given this frame of reference, it is reasonable to suggest five factors that bound attitudes toward policy alternatives at the aggregate level:

1. Technological feasibility—This is essentially an indicator of how close to subjective acceptability the perceived mechanics of the alternative are;
2. Social acceptability—Here the concern is with attitudes toward innovation and change as they are perceived to impact the larger social group or community;
3. Attitudes toward the economic costs of a policy alternative—Again the issue is not objective dollar costs or objective rates of return but the subjective meaning inherent in the magnitude of investment associated with a policy alternative;
4. Political acceptability—When a policy is proposed, it will usually impact the political structure and through that the institutional arrangements by which a society operates; and
5. Temporal acceptability—With or without objective information, the society may be expected to have a subjective judgment about the acceptable delay to problem solution (such a time window is an essential consideration in policy development).

Evaluation of these five dimensions can be based on attitudinal measures that provide policy makers some insight into subjective responses to the policy alternatives they are considering. The simplest scaling approach has been chosen to test this hypothesis: categorical judgment.

In a pilot study, 50 respondents were given a global description of each of the seven conservative policy alternatives and were asked to rate each on the acceptability dimensions by using a nine-point scale. The scales were internally consistent on each alternative, and all the discriminant dispersions were the same. The scale values on each dimension were normalized, and a matrix of judgments and policy alternatives were generated. Because the procedure generates equivalent interval scales, the values for each alternative are additive. Hence, the column totals are an overall measure of subjective judgment of the acceptability of the seven alternatives. Because the variance is approximately one unit, it may be concluded that the alternatives were perceived as different. Basically, two alternatives were perceived as highly acceptable: improved traffic control technology and switching to smaller automobiles. Two were judged as mildly acceptable: car pooling and improved public transit. The remaining three were either neutral or slightly negative. Within each dimension, however, there were large differences. These may be evaluated independently and in a variety of ways. However, for present use the column totals do provide a simple summary measure of the subjective perception of the acceptability of the alternatives.

POLICY ANALYSIS MATRIX

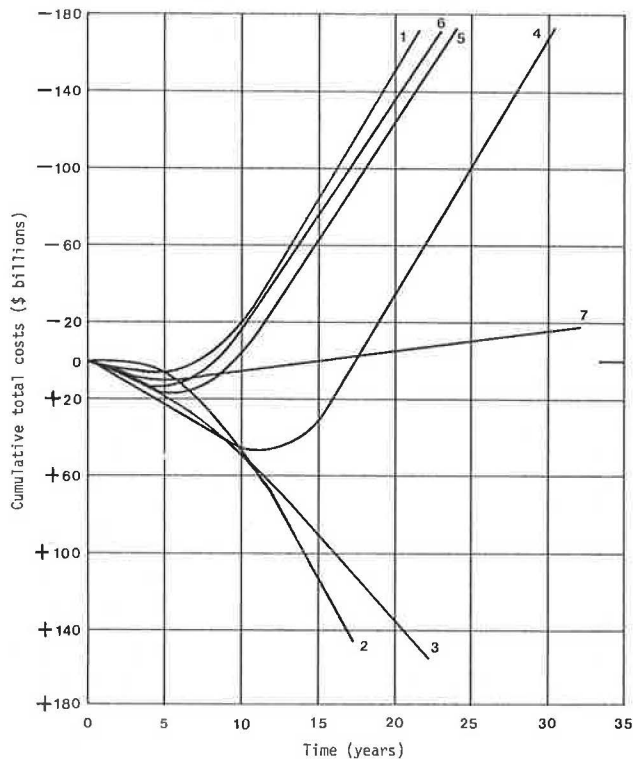
In this policy analysis we have generated four different and independent measures of the seven oil-conservation alternatives. If these four analyses in fact measure different dimensions of importance to policy making then there should be no significant correlation among the four. A rank correlation was used to compare the four measures. The largest correlation coefficient is 0.6, which is not significant. Hence, we can conclude that the four

Table 1. Summary of evaluation of oil-conservation policy alternatives.

Policy Alternative	Oil Savings (m ³ /day)	Societal Costs (billion \$)	Time to Implement (years)	Acceptability Rating
1. Land use change	33 390	-14.5	13	-2
2. Regional transit	14 310	+15.2	9	4
3. Car pooling	30 210	+9.6	8	5
4. PRT	34 980	-20.0	18	3
5. Traffic control	27 030	-12.8	14	9
6. Substitution of communication	15 900	-12.7	10	2
7. Smaller vehicles	58 830	-1.1	7	7

Note: 1 m³/day = 6.29 bbl/day.

Figure 1. Cumulative societal costs of seven oil-conservation alternatives.



dimensions are independent.

It is especially interesting to note that subjective acceptability is independent of all the objective measures. Respondents clearly do have attitudes toward and preferences for the policy alternatives and these systems are seen within that subjective framework. As a factor in itself, these acceptability functions define a unique and important dimension for consideration in policy making.

The policy development process described in this paper represents an attempt to provide evaluative information to public decision makers in a form and content responsive to their needs. The process is based on two assumptions. One is that data and their analysis should be open rather than closed. By definition, decision makers need to be able to make decisions.

The second assumption is that public policy making has an essential linking function between the society and its decision making. Because on matters of social concern attitudes and values determine the acceptability of policy alternatives, some measures of these attitudes and values are essential criteria for the policy-making

process. Any policy development process that overlooks that element not only is incomplete but also will be unresponsive to a basic concern of public policy makers.

REFERENCES

1. R. F. Baker, R. M. Michaels, and E. S. Preston. *Public Policy Development Linking the Technical and Political Processes*. Wiley-Interscience, New York, 1975.
2. R. M. Michaels. *Transportation Technology and Its Effects on the Human Environment*. In *Transportation and the Changing South* (T. E. Nichols, ed.), North Carolina State Univ., 1967.