

A REVIEW OF MODELS IN THE POLICY PROCESS

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Martin Greenberger, Matthew A. Crenson, and Brian L. Crissey, *Models in the Policy Process: Public Decision Making in the Computer Era* (Russell Sage Foundation, New York, 1976, 355 pages).

Public policy analysis is still in its infancy, but it has already had a number of major successes and notable failures. *Models in the Policy Process* describes the field, analyzes the successes and the failures, and considers how the field should change to fulfill its potential. The book also shows the central role that modeling plays in policy analysis and describes in detail some of the most common types of models that have been used. It is a fine book -- very well written and easy to read. I found it hard to put down.

*Models in the Policy Process* states clearly that public policy analysis has been a disappointment to many who had high hopes for it. "Both model designers and sponsors share a general impression that the actual uses of modeling in government have fallen short of expectations. The gap between expectation and achievement is widest in the policy applications of modeling" (page 26). In investigating the source of this gap, the authors use a case study approach, analyzing specific examples of policy modeling and specific modeling methodologies.

Since public policy analysis is basically the application of systems analysis to decisionmaking in the public sector, a policy analysis study generally proceeds through the eight steps of systems analysis:

1. Identification of the problem
2. Identification of the objectives of the analysis
3. Choosing evaluation criteria
4. Selecting alternative policies
5. Analysis of the alternative policies using a model of the system
6. Comparison of alternatives on the criteria chosen
7. Implementation of the "best" alternative
8. Monitoring and evaluation of results

The authors, like most policy analysts, concentrate on Step 5, the use of models for analyzing alternative policies. In fact, nearly half the book is devoted to presenting histories of the development and application of nine modeling methodologies that are used in most policy analysis studies: input-output analysis; linear programming; two-person zero-sum games; probabilistic methods of operations research; econometric modeling; microanalysis; land-use analysis; and systems dynamics. Two of these methodologies, systems dynamics and econometric modeling, are given extensive treatment. The information presented for each methodology is similar: the primary actors involved in its development; the major milestones in its history; and a brief description of the mathematics that support it. The histories of the methodologies are captivating. Each one reads like a miniature historical novel, complete with family trees, triumphs and defeats, friends and enemies. As a result of the heavy emphasis on modeling, however, little attention is paid to the other seven steps of systems analysis, most of which play a more important role in determining the success of a policy analysis study.

The authors use systems dynamics to illustrate many of their points. About 20 percent of the book is devoted to this methodology, primarily the controversy surrounding J. F. Forrester's models of the world described in *World Dynamics*, and the Club of Rome's use of the World 3 model in *The Limits to Growth*. There is also an excellent presentation of the conclusions from and controversy surrounding Forrester's *Urban Dynamics*. Each case appears to have been thoroughly researched and documented, and the position of each participant in the controversy clearly explained. Both sides of the systems dynamics debate are presented, although the detractors get more space and seem to present the more persuasive arguments.

The authors offer several reasons why most policy modeling efforts "fall short of their potential as instruments for the clarification of policy issues and the enlightenment of policymakers" (page 321). The one that the authors conclude is most important is that "the inner workings of a policy model are seldom understood by anyone but the builders of the model (and not always by them). This

is a weak foundation for gaining the reliance and trust of policy-makers" (page 339). They therefore propose "the development of a new breed of researcher/pragmatist--the model analyzer" (page 339), who would, among other things make sensitivity studies, probe questionable assumptions, trace policy conclusions, and simplify complex models. They claim that they have definite ideas on how this third-party model analysis can be developed as a new profession, but say that the book is not the place to spell them out. I wish that they had spelled them out. I find the concept interesting but likely to be impractical. The authors' one-page discussion is not very persuasive, and offers no evidence that they have given careful thought to the suggestion.

The conclusion of the authors that I find most convincing is that there is a basic deficiency in the way most policy studies are conducted. It is that they are performed at universities or research centers that have no identifiable policymakers as clients. Thus there is a "gulf that exists between policymakers and policy modelers" (page 320), so that "communications between public officials and modelers are usually indirect and often fortuitous" (page 232). They suggest that new institutional arrangements are required to "improve the relationship between the consumers and producers of models -- reduce misunderstanding, facilitate communication, and promote mutual acceptance and respect" (page 326). In short, partnerships between policy analysts and policymakers.

As an example of an effective institutional bridge between analyst and policymaker the authors devote three chapters (about a quarter of the book) to The New York City-Rand Institute, an organization that did policy analysis for New York City between 1968 and 1975. The Institute was a joint venture of The Rand Corporation and the city. It was far enough removed from city politics to avoid working on the day-to-day problems of keeping the city going, but close enough to determine the underlying problems that needed solution (and the real-world constraints on solutions). The Institute was also conceived as a continuing partnership, a relationship rarely

enjoyed by outside consulting firms, which generally work on short-term, mission-oriented contracts. This continuity meant that long-term research plans could be developed and that the analysts could see their recommendations through to implementation.

The authors present case studies of two of the Institute's projects: (1) a success story involving the New York City Fire Department; and (2) a prolonged failure in dealings with the Health Services Administration (HSA).<sup>\*</sup> Following the pattern of the discussion of the modeling methodologies, these case studies are presented in an engrossing, reportorial style with the modelers often speaking for themselves.

Having been intimately involved in the Institute's work for the Fire Department for six years, I can attest to the accuracy of the facts. The authors have captured the feeling of the organization and the attitudes of its staff members quite well. Of course, like good reporters, they have strung together disparate events to create stories in which the pieces fit together a little too neatly, and the causes, effects, motives, and mistakes seem much clearer than they ever really were. But the conclusions they have drawn from the Fire Department and HSA cases are reasonable and insightful. In fact they go to the heart of what policy analysis is all about and the best way to do it.

One conclusion in particular is striking. It deals with the need for a division of responsibility between analysts and policy-makers. The Institute was a joint partnership between The Rand Corporation and New York City -- analysts and policymakers. In the case of the Fire Department there was no confusion about the roles of each group in what turned out to be a team effort. The analysts on the team did the modeling; the Fire Department members of the team defined the objectives, supplied the data, explained the operational environment, identified the constraints on feasible solutions, and chose the policies to be implemented. However, the HSA administrator

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<sup>\*</sup>There is, in fact, a third Institute case study presented earlier in this book: the use of simulation modeling to study the tidal flow patterns of Jamaica Bay, for which the client was the Department of Water Resources.



had a staff of management specialists and systems analysts (an Office of Program Analysis), which was responsible for conducting short-term studies of HSA operations, and an Office of Health Systems Planning, which was responsible for long-term studies. The "partnership" in the HSA work was between Rand analysts and the HSA planning and evaluation staff. One of the Rand analysts is quoted as saying "I'd always thought that we were working for the wrong people. We were a staff operation working for another staff operation" (page 313). So the authors conclude:

"...where the functions of researchers and policymakers are not clearly distinguished from one another, the confusion that results can create serious tensions....As policymakers become...more sophisticated about the methods and perspectives of researchers, it becomes important to sharpen the boundaries between the functions of policymakers and those of researchers" (pages 315-316).

This is probably the key finding in the HSA case. The mere fact that a policymaker has his own analytical group is not significant. The Fire Department had a Planning and Operations Research group. The Human Resources Administration, for whom the Institute performed several successful model-based policy studies, had an Office of Research and Program Evaluation. In each case the Institute team worked closely with the internal agency group. The major difference between these two successful projects and the HSA project is that, in the former there were clear definitions of roles, clear definitions of objectives, close working arrangements between the personnel in the two organizations, and, most importantly, strong support and commitment to the work from the top policymakers.

While the authors are quite accurate on the whole in the information they present about The New York City-Rand Institute, there is one statement that should not go unchallenged. On page 236 the authors say: "One of the early goals of The Rand Institute was to develop models and techniques which could be usefully extended to other cities. Little progress was made in this direction, however, save for some aspects of Rand's work in special areas." In fact, the

Institute's work on the deployment of fire, police, and ambulance services was extended to a large number of cities. Under contracts with the U.S. Department of Housing and Urban Development and the cities of Trenton, New Jersey and Yonkers, New York, the Institute field tested the methods and models that it had developed for deployment analysis in seven cities other than New York. Based on these tests the models were modified, fully documented, and made available for use in still other cities. The seven case studies were published, and a training course in the deployment of emergency services was developed.\* At last count the Institute's deployment models have been or are being used in over fifty cities, including some in Canada and Europe.

I had one other problem with the book: it seems to be uncertain about its audience. This shows up to some extent in unfocused and repetitious material, and to some extent in technical details that are too sophisticated for a nontechnical audience but too simple for a technical one.

The repetition is most bothersome in the discussion of systems dynamics. Much of the same material is presented, and some of the same points made, in Chapter 1 ("Model of the World"), Chapter 4 ("System Dynamics" as one of the "Nine Methodologies," and "A System Dynamics Model of Housing"), and Chapter 5 ("System Dynamics -- A Controversial Newcomer," which includes subsections entitled "Legacy of Controversy," "Urban Dynamics," and "The World Models").

The problem of the presumed technical level of the reader is clearest in Chapter 3, "Modeling in Cross Section," which describes the purposes, uses, and types of models, and how models are developed. The approach used is very formal, theoretical, and academic. The nontechnical reader will find it hard to follow. The technical reader will know most of the information already, or will want a fuller discussion.

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\*All of these reports and documentation are described in *The Deployment of Emergency Services: A Guide to Selected Methods and Models* by Warren E. Walker (R-1867-HUD, The Rand Corporation, Santa Monica, California, 1975).

But there *is* an audience for this book, and I think a large one. First, it can be used as the introductory text for a course in public policy analysis. It raises many important issues that should be discussed in such a course. Second, it should be of interest to progressive public administrators, either as a primer or as a well-documented survey of the policy analysis experience.

Perhaps as a result of some of the suggestions in this book, and the training of a new generation of policymakers and analysts, the next book about the use of models in the policy process will find that the gap between expectation and achievement has narrowed.