Chapter IV

FACTORS AFFECTING THE SUCCESS OF DEMONSTRATIONS

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The previous section developed a conceptual framework with which to discuss factors that affect the success of both policy-formulating and policy-implementing demonstrations. In this chapter we advance several propositions concerning the determinants of success of demonstrations and assess the evidence contained in the literature concerning these propositions. As in the last chapter, our emphasis is on the use of demonstrations as a logical step in an R&D process. Because the experience with policy-implementing demonstrations is rich, we begin our discussion there.

Factors Affecting the Success of Policy-implementing Demonstrations

Given the manner in which we have defined policy-implementing demonstrations, the criteria by which to judge their success is straightforward: did the demonstration result in the diffusion and use of the demonstrated innovation in other sites? An innovation may be an industrial process, a new product, or a program design. In the course of the innovation's diffusion to other sites, it may be expected to change somewhat in response to the needs and interests of that site. It is a matter of judgment as to when the innovation has sufficiently changed that it should no longer be viewed as the same innovation.

The analysis above together with the literature that we have reviewed suggest that a number of propositions concerning the use of demonstrations that should guide policy makers at the Federal level:

- Implementation demonstrations having technologies with low reproducibility are unlikely to lead to successful diffusion.
- If a technology is well in hand, a policy-implementing demonstration has a higher probability of success than if the technology is not well in hand.
- Implementation demonstrations that are conducted in a well-developed institutional environment where there is a clearly accepted Federal role are more likely to achieve diffusion success.
- An innovation requiring cooperative action among elements of an institutional environment will be less likely to diffuse than one with an application within the scope of a single institution.
- User need, as exemplified by non-Federal initiative and cost/risk sharing, is an important factor in the success of policy-implementing demonstrations.
- Lack of time constraints and operational flexibility are important to the success of policy-implementing demonstrations.

Each of these propositions is discussed in detail in the following,

Technologies With Low Reproducibility

If the technology is perceived as being nonreproducible, a demonstration incorporating that technology will not be likely to lead to successful widespread diffusion of similarly performing processes or projects because potential users will not be able to reproduce the demonstrated process. Projects incorporating nonreproducible technologies may provide ideas to other potential users; they may suggest pitfalls to avoid in 1 plementing a project; they may even provit equipment and materials that can be used b others. But they seem unlikely to lead to similar operations in other locations.

Available evidence is consistent with this proposition. Education, for example, possesses technology with low reproducibility. In their study of Federal programs promoting educational change, Berman and McLaughlin found no significant diffusion of the innovative projects sup-

ported under the programs. Their study showed that (1) local staff preferred to develop their own material, even when prepared material was available; (2) successful projects that differed substantially from usual practice were viewed as nonreplicable by staff from other locations; (3) rather than search for alternatives, local staff preferred to solve problems by using information already known to local personnel; and (4) local personnel tended to view their own site as unique. As a consequence of these characteristics, the Change Agent study hypothesized that significant innovation could be implemented only through a process of "mutual adaptation. " It reported:

> The initial design of an innovative project must be adapted to the particular organizational setting of the school, classroom, or other institutional hosts, and, at the same time, the organization and its members must adapt to the demands of the project. Many educational innovations may fail to have desirable effects because the project is not adapted to the institutional setting or vice versa during the implementation stage.2

This model of change requires unique interaction of the innovation with staff at each potential adoption site. Given such a requirement, it seems unlikely that exemplary projects at selected demonstration sites will be replicated elsewhere.

If diffusion is no longer a relevant success criterion for such demonstrations because a unique implementation of a technology with low reproducibility is required at each site, Federal policy makers should consider redefining the goals of a program supporting such projects. Perhaps these programs should consciously seek site-specific development for use mainly at the project site. In such cases, decisions to initiate a project should be evaluated on the basis of the costs and benefits associated with an individual adoption. The use of the term "demonstration project" would appear misleading for this type of project. ' We have referred to this type of program as *subsidized local development.*

In a number of areas, innovative technologies of substantial reproducibility are used in a larger "system, " where adaptation of the innovation may occur. Examples include mass transit, law enforcement hardware, and mining. Success of demonstrations where such adaptation can take place depends in part upon the perceived similarity of the environment in which the demonstration is conducted to that of the potential adapter.

Two examples from mass transit illustrate this point. The Shirley Highway Express Bus Lanes in the Washington, D .C., area used conventional buses and highway and street lanes exclusively designated for buses. The project measured actual ridership and thus avoided the theoretical debates in the mass transportation community about the relative importance to potential commuters of trip time, waiting time, transfers, or comfort. The success of the system in attracting commuters and in showing that the demonstration results are relevant to other metropolitan areas with radial commuting corridors has led to diffusion of the concept to other cities. "

In contrast, the Personal Rapid Transit (PRT) demonstration which, as we shall note, experienced many technical difficulties, was demonstrated in such a specialized situation that it seems unlikely that it would have been persuasive even in the absence of technical problems. This system, involving unattended small vehicles operating on a fixed track, was used to connect parts of The University of West Virginia in Morgantown. It seems unlikely that the conditions prevailing at this university campus would be sufficiently similar to other contexts for this innovation to be persuasively demonstrated to city planners. The demonstration did not provide credible predictions of the relevant outcomes.

The existence of replicated projects may also be important to the diffusion of innovations using technologies with low reproducibility. Yin discusses this issue with respect to innovation in local law enforcement. In considering the Kansas City Preventive Patrol Experiment as an exam-

'Paul Berman and Milbrey Wallin McLaughlin, Federal Programs Supporting Educational Change, The Findings in Reuiew: Vol. IV, The RAND Corporation, R-1589/4-HEW, April 1975, p. 1, hereafter referred to as the Change Agent study.

'Ibid, p. 6.

'It should be noted, however, that experiences with this type of program are not encouraging. The Change Agent study found that only 5 percent of a sample of such local development projects resulted in permanent incorporation of the project.

'Cheryl D. Hayes, "Toward a Conceptualization of the Functions of Demonstrations, " in Thomas K. Glennan, Jr., (cd.), Studies in the Managment of Social Research and Development, The National Academy of Sciences, Washington, D. C., forthcoming.

pie, he cautions that "findings . . . are not facts.'" Unless successful results are experienced at multiple sites, they may not be credible to potential adopters. Diffusion of intermediate strength technology innovations in the absence of such replications is not likely.

Technology That Is Well in Hand

The degree to which a technology is in hand will affect the success of policy-implementing demonstrations. In projects using technologies that are not well in hand, managers must concentrate on developing and improving the technology. The rhythm of the project will reflect the technical needs of development activities. On the other hand, the concerns of the adopters will frequently focus on questions such as the reliability of the process, the administrative feasibility of implementing the process with the manpower available at local sites, and the operating costs of processes under routine conditions. If the technology is not well in hand, evidence concerning these latter issues will be more speculative and less clear. The demonstration may well be less than effective in persuading adopters to make a decision to implement a new innovation.

The Federal Demonstrations study provides persuasive evidence that the lack of technology well in hand adversely affects diffusion. This study found little or no diffusion in any of the demonstrations for which there was high technical uncertainty. Uncertainty was considered high "when the technology has not previously been prototype or field tested; or when basic problems with the technology are known to exist, and techniques for dealing with them are not clear at the time of the demonstrations. 6 With one exception, all of the examined demonstrations of technologies with medium or low uncertainty achieved at least some diffusion success unless there were institutional problems. [7] A possible explanation for this finding is that the lack of uncertainty enables a realistic appraisal of the prospects for successful implementation. As a consequence, technologies that do not possess some advantage over the status quo are not demonstrated.

The exception to this pattern—a demonstration of a seawater desalination process in Freeport, Tex.—is instructive. The demonstration involved testing a large-scale version of a desalination process previously tested only in a pilot plant. The project was classified as having medium preproject technological uncertainty. The process required significant development work during the course of the demonstration, which resulted in important improvements in performance but also in interruptions in plant operations. At the end of the demonstration, the technology could be considered well in hand. However, potential adopters of desalination plants mistakenly perceived these instructions at the Freeport plant as an indication that the desalination process was unreliable. These potential adopters failed to understand that the interruptions were necessary for technological development work to occur.[8]

The PRT demonstration illustrates how the implementation of an undeveloped technology affects the operational results and the innovation's diffusion. The major leap in technology incorporated in the project led to rapid escalations in cost, ultimately to a cost of over $60 million. To keep costs down, the system was modified and curtailed, and the resulting system provided little useful data on the possible spacing of vehicles, the relative attractiveness of PRT to private transportation, or other important measures.[9]

The Freeport desalination and the PRT cases illustrate the importance of considering an alternative to a demonstration when a technology contains some elements of uncertainty. When high technological uncertainty exists, a full-scale test at a test-bed facility should be considered. This test of the technology at the development-oriented facility would ease the development of engineering solutions to technical problems by removing real-world operating constraints.

[5] Robert K. Yin, R&D Utilization by Local Services: Problems and Proposals ~or Further Research, The RAND Corporation, R-2020 -DOJ, December 1976, p. vii.

'Federal Demonstrations. p. 31.

'Medium technological uncertainty was considered to exist when technology had been tested at a lower scale but uncertainties remained about performance at near-commercial size or where uncertainties remained concerning performance of a new configuration of components. Low technological uncertainty characterized projects using existing components in configurations similar to previous use. See Federal Demonstrations, p. 31.

"William F. Hederman, "Saline Water Conversion Plant," in Federal Demonstrations: Case Studies, pp. G 1-G46.

'Federal Demonstrations, pp. 137-138.

Demonstrations in Well-Developed Institutional Environments

Areas with well-developed institutional environments pose relatively minor problems for Federal policies governing the use of demonstrations. Their very development means that the innovation system is working well and probably on a continuing basis. Mutual agreement exists concerning when demonstrations are appropriate. Sponsors and performers of demonstrations will know which actors to involve and those actors will understand the needs and patterns of success within the policy area.

Poorly developed institutional environments seem more likely to give rise to the type of goal and value conflicts among the actors that have been mentioned frequently in earlier sections of this report. The absence of close ties among the actors, lack of important institutional entities, or the lack of consensus over the appropriate means of bringing about and diffusing innovations all lead to the possibility of such disagreements over goals and values.

The empirical literature tends to support this proposition. The Federal Demonstrations study found that all demonstrations that examined what had taken place in well-developed institutional environments had achieved at least some diffusion success.

Moreover, the evidence indicates that the participation of the components of the institutional environment is also important to diffusion success. The Federal Demonstration study found that only one demonstration project that excluded some active components of the institutional environment was diffused.

The exception to the observed pattern illuminates this proposition. A demonstration of mechanized refuse collection aimed at reducing labor costs through smaller collection crews was a striking application success. The service, provision of a mechanism to improve truck refuse collection, was cost-effective and received strong public approval (exceeding 90 percent). However, the mechanism was designed by city personnel, and no garbage-truck outfitting firm could be found to market the new truck. Consequently, the diffusion observed was piecemeal and not self-sustaining, a disappointing result for an innovation based upon a reproducible technology that was successful in its initial application.11

The innovative behavior of local governments suggests the existence of goals other than those that would normally be emphasized in the planning and execution of a demonstration project. For example, in an investigation of technological innovation in State and local services, Yin and his colleagues found that evidence on the trial and adoption or rejection of new technologies supported two differing interpretations of how local agencies operate, One model, termed a problem-solving model, involves local identification of problems and a search for means to solve the problems. The second emphasizes conditions of bureaucratic self-interest that govern the innovations to be incorporated. Yin et al., in a study of innovation, suggest that both models of innovative behavior may operate at the State and local level.

The important point to note in these findings is that demonstrating a new technology is not an effective way to influence local problem solving and the bureaucratic process. The character of local innovation seems to spring from the characteristics of each locality and the needs that they perceive, rather than from the opportunities presented by a demonstrattion project. This discrepancy may be part of the reason that Yin's analysis found no statistically significant relationship between a variety of Federal policies and successful incorporation in local innovation. *[3]

Requirements for Cooperative Efforts

An innovation requiring cooperative action among elements of an institutional environment will be less likely to diffuse than one where its application is within the scope of a single institution. Innovations can be significantly mismatched to the institutional environment to which they are intended to apply. In such instance, even if the environment is developed and the technology is free of uncertainty, diffusion may not take place.

'"Federal Demonstrations, pp. 51-53. The one exception to this finding appears to have been examined too soon after the demonstration for any meaningful assessment of diffusion to have been made.

"Federal Demonstrations, p. 96.

'2Robert K. Yin, Karen A. Heald and Mary E. Vogel, Tinkering with the System, Chapter 5, Lexington Books, Lexington, Mass., 1977.

'31 bid., Chapter 6.

The regional emergency medical service is a case in point. The capability of specialized systems of emergency medical care to save lives has been demonstrated. Necessary equipment, personnel, and organizational procedures are known and local governments and communities seem to appreciate the need for such services. Nonetheless, the development of these systems has been sporadic.

A major reason for this sporadic development is that the appropriate scale for such operations exceeds the scale of most local political jurisdictions and hence requires cooperation across jurisdictional boundaries. Funds must be raised from a variety of jurisdictions, central control and management must be agreed upon, and a variety of hospitals and other medical providers must cooperate. Because this type of joint effort is difficult to bring about, the diffusion of the innovation is slow and uncertain even though there has been Federal funding to support it.

The use of cable telecommunications to provide social services seems likely to face similar problems. Effective use of this medium will require cooperation among a number of social service and regulatory agencies as well as several levels of government. These agencies have disparate and conflicting goals and frequently resist efforts of other agencies to enter their areas of specialization. Diffusion of cable technology for these uses will not occur easily.

User Need

A serious commitment to the innovation by the performer is important to the successful operation of a demonstration. Both the Change Agent study and the Federal Demonstrations study found non-Federal initiative to be important to demonstration success. The Change Agent study's description of the two types of project initiation encountered—opportunism and problem solving—illustrates the problem well:

> Projects generated essentially by opportunism seemed to be a response to available funds and were characterized by a lack of interest and commitment on the part of local participants—from district administrations to classroom teachers. As a result, participants were often indifferent to project activities and outcomes, and little in the way of serious change was ever attempted—or occurred.
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> The problem-solving motive for projects emerged primarily in response to locally identified needs and was associated with a strong commitment to address these needs. Federal funds were viewed as a way to support the local solution—one which often broke new ground in local educational practice. 16

Cost sharing by non-Federal participants is an indication of interest. The Federal Demonstrations study found that demonstrations with large shares of Federal funding (more than 90 percent) had a poor chance of diffusion success.

The form of the cost sharing is also important. For example, the share of costs for projects at the State and local levels is frequently small and in the form of contributed space and services. In such instances, the type of opportunism that the Change Agent study notes can easily occur. It seems likely that larger contributions, involving staff and financial resources, will assure that at least some consideration is given to whether the demonstration is consistent with the interests of the local jurisdiction. For example, the mechanized refuse collection demonstration that was cited earlier involved contributions of nearly 40 percent of the cost by the city of Scottsdale, Ariz.

When the intent of the demonstration is to promote the commercialization of a technology by the private sector, a variety of forms of cost sharing are possible. A close-ended contribution can be made as was the case with the Atomic Energy Commision's Power Demonstration Reactor Program. 18 Loan guarantees can be provided as was contemplated in the proposed synthetic fuels legislation. 19 The demonstrating firm

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"The Comptroller General of the United States, Progress, but Problems, in Developing Emergency Medical Service Systems, Washington, D. C., July 13, 1976.

"For an interesting discussion of this point see William A. Lucas, "Social Service Applications of Electronic Abundance," in Forrest Chisman and Glen Robinson (eds.), Communications for Tomorrow: Policy Perspectives for the Future (tentative title), Aspen Institute, Washington, DC., forthcoming.

"Change Agent study, p. 9

"Federal Demonstrations, p. 96.

18 Federal Demonstrations. Case Studies, pp I-55 and 1-56.

"U.S. Congress, House. 94th Cong., 2d Sess., Committee on Banking, Currency and Housing, Loan Guarantees jor Demonstration of New Energy Technologies, report to accompany H.R. 12112, Washington, D. C,, June 1976.

(or consortium of firms) can make a fixed contribution and the Government can support the remainder, as was proposed in the Clinch River Breeder Reactor Demonstration .'" Tax subsidies may be provided for specific types of investments. The Government may guarantee the price of the output of a particular plant. Detailed examination of these various methods of finance is beyond the scope of this report, and in any case must be made on a case-by-case basis. Nonetheless, the literature provides a few guiding principles.

The MIT Energy Laboratory Policy Group, in examining policies for commercialization of energy technologies, suggests three guidelines:

1. Subsidies for demonstration projects should simulate the workings of the normal market and should be as small as possible.
2. The mechanism for providing the subsidy should ideally provide managers with a circumstance much the same as that in the unsubsidized case. In particular, it should be neutral with respect to the choice of inputs such as capital, labor, transportation, and maintenance.
3. The financing mechanism should reveal the full costs of the program and the detailed cost performance of the individual technologies. Loan guarantees are cited as poor means of achieving this objective because the degree of subsidy is not obvious. 21

These guidelines suggest simple, obvious cost arrangements designed to elicit a commitment to the effort by the private-sector firm.

Federal Demonstrations suggests that at the beginning of planning for a demonstration project, a survey of possible participants should be made to determine their willingness to participate in the demonstration. Lack of willingness to make substantial contributions to the cost may well indicate that technological uncertainty is too high to proceed with a demonstration, that market demand is weak, that costs are high, or that institutional factors or side effects are likely to inhibit the use of the innovation .22 Thus, the Federal Demonstrations study suggests that the willingness to share costs may be an appropriate "market test" for the demonstration of a new technology.

This willingness cannot always be used as an indicator of commitment. If the problem to which the demonstration is addressed arises because of State or local inattention or indifference, a strong cost-sharing requirement may merely provide a convenient excuse for that Government to avoid response. There is no easy solution to this dilemma.

Time and Operational Flexibility

In the Federal Demonstrations study, not one demonstration that proceeded under strict time constraints achieved any diffusion success. It is also worth noting that none of these demonstrations produced the information necessary to make an adoption decision, and only one was successfully adopted at the demonstration site. These time constraints had little to do with interest in diffusing the innovations. They were primarily generated by other policy and political needs .23

Operational flexibility allows the project performers to react to unanticipated events—either to avoid or recover from negative events or to take advantage of positive ones. Every demonstration encounters some unexpected situations of varying importance. One reading project examined in the Change Agent study encountered a freeze on the use of outside contractors who were to print a locally developed test, the printing of the wrong version of the test by student printers, and a citywide teachers' strike .24 In another case, an attempt to extend a classroom organization project to a junior high failed. By completely redesigning the program consistent with the elementary project but using different techniques, a "significant degree of success" was achieved .25

[20] Leland L. Johnson, Edward W. Merrow, Walter S. Baer, and Arthur J. Alexander, Alternative Institutional Arrangements for Developing and Commercializing Breeder Reactor Technology, The RAND Corporation, R-2069 - NSF, November 1976, pp. 117-120.

"Policy Study Group, Energy Laboratory, Government Support for the Commercialization of New Energy Technologies, An Analysis and Exploration of the Issues, MIT, Cambridge, Mass., November 1976, p. 11.

"Federal Demonstrations, p. 71.

[23] 1bid, pp. 53-54.

"Peter Greenwood et al., Federal Programs Supporting Educational Change: The Process of Change, Vol. III, The RAND Corporation, R-1589/3-HEW, April 1975, p. 43.

"Ibid, p. 44.

The Change Agent study found that attempts to prescribe management techniques were "usually counterproductive, leading to nonimplementation or cooptation. "[26] The Federal Demonstrations study does not dwell on detailed management procedures for the hardware demonstrations except to state that "onsite management was generally effective, " meaning that project management was not a major source of trouble in the cases studied .[27]

Factors Affecting the Success of Policy-Formulating Demonstrations

In comparison with policy-implementing demonstrations, there has been relatively little examination of the success or failure of policy-formulating demonstrations. In part, this is because there have not been many such demonstrations. More importantly, however, the complexity of the policymaking process makes it difficult to trace the use of information produced by such demonstrations.

The making of policy seldom conforms to the models of rational decisionmaking that are presented in the literature. At the Federal level, policymaking extends over a long period of time and often includes loosely coupled actions at several levels of Government. For example, debate over the Nation's welfare system has been going on for decades, with additions from time to time of new information or new calls for national concern. Perceptions concerning the fiscal health of cities have shaped the nature of the program solutions that have been advanced. The almost inadvertent expansion of programs such as food stamps changes the need for welfare reform. Determining the role that a particular piece of information plays in shaping a particular policy is virtually impossible,

Policymaking consists of identifying problems, searching for possible courses of action, articulating and evaluating these courses of action, and choosing one or a combination of the options. These are not necessarily sequential events, however. The definition of the problem may take place as a committee of Congress or a legislative drafting group articulates and evaluates proposed programs. A possible solution may be shaped by policy actions in quite different problem areas. The identification and articulation of policy alternatives may occur in adversary proceedings or as the result of patient analytical staff work.

Demonstration projects may make contributions to virtually all steps of the policymaking process. The most obvious contribution is the articulation of the consequences of adopting a particular policy. Estimates of the costs, performance, and unanticipated effects of a policy or program may be obtained. However, the process of designing the project may help to clarify the nature of the problem and therefore to define the objectives of a potential policy. Conducting a demonstration may be a means of advocating the consideration of a policy alternative by groups or programs that have the interest and resources to do so. It is even possible to imagine that an array of projects which embody the various policy or program alternatives could provide decisive information for choosing among policies.

Of course, many factors affect the outcome of a policy debate besides the predicted performance of the policy itself. Distribution of benefits and costs among groups, regions, or industries may be important. The particular interests and values of policy makers in important positions will shape both the alternatives considered and the choices made. Crises or events that require immediate action may make quick decisions imperative. Consequently, it will be very difficult to provide sharp assessments of the success or failure of demonstrations that seek to contribute to the policymaking process.

The distinction between policy-formulating and policy-implementing demonstrations was originally made to categorize the purposes of social demonstrations. 28 Social experiments such as those dealing with housing allowances, income maintenance, health insurance, and utility rate structures fit the description well. Other social service and education projects can be identified that are tested in realistic environments to determine if they should be put into effect in large-scale programs.

[26] *Change* Agent study, p. 26,
"Federal Demonstrations, p. 58.

"Cheryl D. Hayes, "Toward a Conceptualization of the Function of Demonstrations, " in Thomas K. Glennan, Jr., (cd.), Studies in the Management OJ Social Research and Development, the National Academy of Sciences, Washington, D. C., forthcoming.

While the concept of a policy-formulating demonstration has not been used with more technical hardware projects, it is clearly applicable. Within the military systems, tests of new aircraft or weapons systems frequently provide a basis for decisions as to whether or not to procure the system and begin large production runs. A number of demonstrations have also been carried out as an aid to formulating regulatory policy. For example, the aircraft industry and the airlines under National Aeronautics and Space Administration (NASA) sponsorship and with the participation of the Federal Aviation Administration (FAA) designed and tested quieter engines to reduce the noise at airports (Project Refan). Data on costs and performance were obtained that have helped to shape FAA policy in this area. [a] The detailed observation of Dunes airport landings and takeoffs of the Concorde supersonic aircraft is a demonstration to help establish appropriate noise level standards for such aircraft.

The complex nature of most policy decisions precludes the sharp designation of criteria for success or failure of a demonstration. Instead, we suggest two attributes of a demonstration that would seem to be necessary for success:

- Perceived quality of the information provides,
- Perceived relevance of that information to the policymaking process.

We emphasize the term "perceived" because it is difficult to specify intrinsic qualities of demonstrations that can be associated with all successful demonstrations. "Success" in the creation of new policy is likely to reflect the political resolution of the value conflicts in question, and thus can be only partially related to the outcome of a demonstration project.

Perceived Quality

Policy makers in varied positions or at different times will prefer different forms of evidence. For example, during the late 1960's and early 1970's, many Federal executives pushed for improved experimental designs for demonstrations. It was hoped that the use of such designs would make the results of the demonstrations more reliable and generalizable. Frequently, these policy makers also sought independent evaluations because of their fear that evaluative information provided by the performers of the demonstrations themselves would be subject to self-serving bias. The observations of program operators, State and local policy makers, or industry executives were viewed as unreliable and insufficient bases upon which to make policy.

Other executives and many Members of Congress expressed quite different preferences. They preferred the input of trusted colleagues or individuals who had provided useful and reliable information in the past. They sought information on a wider range of outcomes than was typically provided by scientific evaluation designs. They valued the ability to observe the actual demonstration, to talk with its managers and with clients of the project.

The preferences for different types of information will depend in part upon the background factors mentioned above. In areas where there is a tradition of R&D and where there is a belief in the strength of the technological base, higher quality scientific information will be important. The quality of the experimental design and the independence of the evaluator will be significant factors in the policy makers' judgment concerning worth of the information. In those areas where there is no such tradition or where the state of the technology is a matter of debate, more qualitative and impressionistic information may be preferred. Thus, these preferences are situation-specific.

Perceived Relevance

The relevance of the information depends upon three factors: (1) the centrality to the policy debate of the information produced by the demonstration, (2) the degree to which parties to the policy debate *jointly* perceive the evidence as valid, and (3) the timeliness of the demonstration relative to the policy debate.

The central issues of a policy debate may be difficult to predict. For example, the income maintenance experiments provide information on the labor force behavior of recipients of income maintenance payments. At the time these experiments were initiated, this information was expected to be a major issue in a debate on the desirability of establishing a widespread income maintenance system; indeed, in the early

[a] "Federal Demonstrations, p. 161: Peter W. House and David W. Jones, Getting It Off the Shelj: A Methodology for Implementing Federal Research, West View Press, Boulder, Colo., 1977, pp. 232-234.

debates this issue was important. However, the debates have now continued for some 8 years and other concerns have become more important. Today concerns are expressed about the distribution of benefits among different classes of recipients and different areas of the country, the manner in which States will participate in the administration of the program, the degree to which benefit levels will vary by area of the country, and the effect the program will have on employment programs. In part, this shift can be attributed to Congress's recognition that political issues surrounding welfare reform relate to the distribution of costs and benefits. In part, however, the reason for the receding relevance of the information provided by the income maintenance experiments may be that their findings were such as to reduce the concern on the part of the lawmakers and the public that there would be massive withdrawals from the labor force.

The success of a demonstration in aiding a policy debate should depend upon the joint acceptance of the validity of the information by participants in that debate. If, for example, one goal of a demonstration is to determine the environmental effects of a new process for the production of synthetic fuel and if both the promoters of the innovation and the interested environmental groups do not agree upon the pollutants to be measured and the means of measuring them, the evidence produced by the demonstration and the policy debate is likely to be less useful than would otherwise be the case. In another context, one problem—although not necessarily the most significant one—in determining the efficacy of Laetrile in the treatment of cancer patients is that agreement among proponents and opponents as to what constitutes a fair test is difficult to conceive.

The timing of demonstrations also poses significant problems. Many policy decisions are made as a result of forces quite independent of the development and evolution of a technology. When a crisis arises, such as the OPEC oil embargo or the urban riots, policies will be formulated and implemented whether or not there is information from demonstrations or other classes of R&D that would affect those policies. Politicians in both executive and legislative branches have short time horizons. They stand for reelection at regular intervals or possess career progression patterns that place them in particular policy positions for short periods of time. Policies are often made in response to pressure from various interest groups. Because of the fluidity of the situation and because of length of time usually involved in the conduct of demonstrations, matching the results of demonstration activities to the policymaking process is troublesome.

The difficulty in matching the timing of demonstrations to decisonmaking varies among policies. Where the question is one of adopting and promoting a major technological device such as a new weapons system or a specific energy-related process such as the breeder reactor, the sensitivity of the policy to evidence concerning the performance of the device may be so widely appreciated that the policymaking will be paced by the evolution of the technological work. A policy-formulation demonstration in this case would set the timing for policymaking.

In contrast, in cases where the technology is clearly not perceived as central to the decisonmaking process, other imperatives that govern the policymaking process will take over. Consider again the income maintenance experiment: the underlying technology, the transfer of funds to individuals contingent upon their other sources of income, was perceived as being feasible from the beginning. The demonstrations focused on the work incentives, unanticipated outcomes, and administrative processes. These issues were not suffiently central to the policy debates that the executive branch or Congress felt the debate should await the completion of the demonstration.

This discussion leads us to advance two tentative propositions concerning factors affecting the success of policy-implementing demonstrations:

- The perceived relevance and usefulness of policy-formulating demonstrations will be enhanced when they are initiated and performed by agencies with close continuing ties with policy makers.
- Policy-formulating projects that give conscious attention to expected points of conflict in the policy debate and address these conflicts in their design will be more successful than those that are developed along the interests of just one party.

Continuing Close Ties With Policymakers

One theme pervades our discussion of factors affecting the success of policy-formulating demonstrations. The success of such demonstrations depends upon the styles and interests of relevant policy makers. Demonstrations initiated and managed by organizations that are closely linked to the policy maker are likely to reflect those interests.

All the cited examples of policy-formulating demonstrations have been initiated and managed by organizations that bore close relationships to executive branch policy makers. The social experiments have been sponsored and monitored by Assistant Secretary level offices of policy planning and evaluation. The regulatory demonstrations were carried out by the cognizant regulatory agency. We have reviewed no examples of policy-formulating demonstrations that have been supported by relatively independent research agencies such as the National Science Foundation or the National Institutes of Health. Thus, we cannot provide evidence to test this proposition.

Although a major portion of the policymaking process concerning the issues examined in these experiments will be associated with the development of legislation, Congress has generally played a minor role in the design of the experiments. Sponsors of demonstrations frequently do not relate closely to Congress. The housing experiments, although mandated by law, were implemented with little input from legislators. The income maintenance experiments were designed on the basis of executive branch perceptions of what the policy issues would be. The same was true of the health insurance experiment.

We have found two instances in which Congress mandated demonstrations to understand the effects of a proposed policy change. The 1972 amendments to the Social Security Act authorized a group of experiments and demonstrations: 30

> to determine the relative advantages and disadvantages of various alternative methods of making payment on a prospective basis to hospitals, skilled nursing facilities, and other providers of services for care and services provided by them under Title XVII . . . including alternative methods for classifying providers, for establishing prospective rates of payment, and for implementing on a gradual, selective, or other basis the establishment of a prospective payment system.

Under this authorization, a number of demonstrations have been mounted; in addition, several existing State efforts to limit the rate of increase of hospital costs have been evaluated, which essentially made these efforts policy-formulation demonstrations .3*

In 1974, Congress authorized up to 20 experimental programs as a part of the Study of the Effectiveness of Compensatory Education Programs. The primary purpose of these programs was to determine the effects of changing the bases upon which compensatory education funds were allocated within a local education agency. Under this authorization, 13 districts are experimenting with policies such as using academic achievement rather than poverty criteria to allocate compensatory education funds. 32

Including Points of Conflict in Demonstration Design

The making of policy frequently involves melding together a variety of conflicting views. This is particularly true for the policies made by Congress. As a consequence, we might hypothesize: policy-formulating demonstrations that give conscious attention to the expected points of conflict in the policy debate and address these conflicts in their design will be more successful than those that are developed along the interests of just one party.

Explicit and participatory processes for seeking the conflicting views were not apparent in the planning of the demonstrations we examined. However, in some cases, particularly those associated with the regulatory demonstrations, many of the interested parties directly participated in the conduct of the demonstration. In the case of the Refan engine, manufacturers, the regulatory

'"Sec. 22 of Social Security Amendments of 1972.

[31]U. S. Department of Health, Education, and Welfare, Social Security Administration, Office of Research and Statistics, Research in Health Care Reimbursement, Spring/Summer 1976, Publication No. (SSA) 77-11901, Washington, D. C., 1976.

[32]National Institute of Education, Evaluating Compensatory Education, an interim Report on the NIE Compensatory Education Study, Washington, D. C., Dec.30, 1976, Appendixes A and B.

agency, and the airlines all participated, and the evidence from the demonstration does not seem to have been a matter of dispute.

Kash et al., in a study of needed energy R&D, proposed that many of the demonstrations of energy supply technologies should be viewed as means of obtaining evidence to resolve disputes among concerned groups such as the environmentalists and industry .33 It certainly seems desirable to assure that the concerns of various parties in a dispute over the desirability of a course of action should be reflected in the design of the demonstration but it must be remembered that some part—perhaps the major part—of the dispute is over values possessed by various parties in a decision, and value conflict will not be resolved by a demonstration project.

Even in cases where there are important disputes over potentially knowable facts such as the level of pollution or costs associated with a particular production process, groups that expect ultimately to oppose the adoption of an innovation (whatever its outcome) may oppose the conduct of a policy-formulating demonstration. Such demonstrations are frequently seen as a means by which a Government agency or industrial corporation that has already made its decision initiates action. These groups tend to doubt the Government's assurance that a demonstration is focused primarily on obtaining information about the desirability of pursuing a course of action. This problem is heightened by the nature of Government-industry relationships that seem likely to lead to successful commercialization efforts—i.e., close and sympathetic ties that promote a good exchange of reliable information.

If the two propositions advanced here are correct, Congress has important contributions to make to the conduct of many policy-formulating demonstrations. Where legislative action is expected to follow a demonstration, Congress needs to assure that the design of the demonstration is relevant to its deliberations. In particular, it must seek to ascertain that issues in which important political constituencies are likely to disagree are treated in a manner that will help to resolve the debate.

[3]'Don E, Kash et al., Our Energy Future, University of Oklahoma Press, Norman, Okla.. 1976, pp. 25-26.