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Influences of Context and Process on Project Planning Success

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Abstract

This study reports results of a quantitative analysis of fifty-eight cases of deliberate efforts to produce major change, or "projects." The results demonstrate that (1) the greater the potential impact on resource allocation patterns, (2) the greater the extent of problem identification efforts, and (3) the more extensive the use of problem solving as a conflict resolution strategy, the more likely it is that project goals will be achieved and that the organization with prime responsibility for the project will be satisfied. The study provides an empirical defense for the utility of planning and planners, and guidance on ways to improve planning practice.

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Introduction

The design and management of planning processes is one area in which planners should be able to claim unique expertise and greater experience than persons trained in other fields. It is therefore quite unfortunate that there is so little sound, large-sample, quantitative empirical research to help clarify which planning processes appear to work best under which circumstances and why (Zaltman, Duncan, and Holbek 1973; Dunn and Swierczek 1977; Bryson 1983; Dalton 1989). As a result, significant improvements in the practice of planning may not be forthcoming, while it simultaneously proves difficult to provide a sounder empirical basis for the defense of planning and planners.

The study reported in this paper attempts to add to the body of literature that might be called *empirical planning theory.* Classic contributions to this literature include, for example, Daland and Parker (1962); Altshuler (1965); and Rabinovitz (1969). Newer contributions include, for example, Krueckeberg (1971); Bolan and Nuttall (1975); Howe and Kaufman (1979); Mayo (1982); and Baum (1987), along with many of the studies cited in the next paragraph. Hypothesized relationships among variables are explored using a sample of fifty-eight cases of deliberate attempts to produce major change, or "projects." For the purpose of this research, a "project" was defined broadly as an organizational or community effort to plan for and implement (1) new organizational designs; (2) new policies, strategies, or plans; or (3) new programs, projects, products, or services.

Our study builds on the work of several theorists who have suggested that the appropriate choice of a planning process is *contingent* on any number of factors. That is, the planning process must be tailored to the particular context within which the changes must be pursued in order to achieve desired outcomes, including outcomes

designed to change the initial context (Beach and Mitchell 1978; Bryson et al. 1979; Bryson and Delbecq 1979; Nutt 1976, 1984; Payne 1982; Kartez 1984; Alexander 1984; Christensen 1985; Boal and Bryson 1987; Kartez and Lindell 1987).

We believe that even the simplest *contingent* model of a planned change effort should include at least four basic elements (Boal and Bryson 1987, 212): the *context* within which the planning occurs, the planning *process* itself, the result or *outcome* of the planning, and the *interconnections* among these three elements. Among the very few studies that have considered all four constructs are McCaskey (1974), Gilbert and Specht (1977), Bryson and Delbecq (1979), Van de Ven (1980a, 1980b), Kartez (1984), Nutt (1984), Hickson et al. (1986), Boal and Bryson (1987), and Kartez and Lindell (1987).

■ Study Design

Our approach in this study is "action unit-centered," in that we focus primary attention on the action unit principally charged with carrying out the project, and define success from the action unit's perspective (cf. Evan 1966; Aldrich and Whetten 1981). In the planning practice world, these action units often are referred to as "lead organizations."

For purposes of this study, *context* was defined as those features of the lead organizations' internal and external environments over which they had relatively little control. *Process* was defined as a set of generic activities that occurs across an entire problem-solving sequence and over which the lead organizations did have substantial control. *Outcomes* were defined from the perspective of the lead organizations. Specific measures are presented in Table 1 and are discussed, along with the data sources and coding procedures, in a subsequent section.

Because the success of project planning efforts is likely to depend on a complex system of interactions, those interactions must be modeled appropriately if correct statistical inferences are to be drawn. In keeping with most of the recent empirical work on contingent approaches to planning, our model assumes that the context of the change process is predetermined and influences both the process of change and the outcomes of the change effort. Further, we assume that process variables affect one another as well as outcomes. We rely, therefore, on a simultaneous equation model that presumes (1) context variables influence process variables; (2) process variables affect other process variables; and (3) both context and process variables affect outcomes. Data and methodological restrictions force us to ignore feedback loops from outcomes to process and context variables, and from process variables to context variables.

We chose to focus on seven contextual variables shown to be particularly important in previous research (see especially Zaltman, Duncan, and Holbek 1973; Bryson and Delbecq 1979; Bryson et al. 1979; Wolman 1981; and Morris and Hough 1986). These were (1) potential impact of the proposed project on resource allocation patterns; (2) potential impact of the proposed project on organizational structures; (3) value conflict among affected parties; (4) activation of potentially affected groups; (5) power of the lead organization; (6) skill level of the planning staff; and (7) perceived technical sophistication of the required solutions at the start of the project. All were measured using five-point Likert scales, typically with differing anchors. The activation variable is an index comprising the Likert-scale scores from three separate questions concerning (1) the level of awareness of the problem among affected groups; (2) the priority given to the problem by these groups; and (3) the intensity of their concern for the problem among these groups.

We attempt to explain four features of the planning processes employed in these cases: (1) the extent of the problem identification effort; (2) the amount of solution identification effort; (3) the frequency of communication effort among the lead organization and other actors; and (4) the use of "problem solving" as a conflict resolution strategy. (Problem solving consists of efforts to find "all-gain" solutions; see Filley 1975 and Forester 1988.) We selected these features both because they are central to past and present discussions of the nature of the planning process, and because they could be conceptualized as variables for purposes of quantitative analysis. Efforts to identify problems and solutions are elements of almost all procedural planning models (Van de Ven 1980a; Nutt and Backoff 1988; Schroeder et al. 1989). More recently, planning theorists have emphasized the importance of communication and conflict resolution efforts as fundamental to planning practice (Forester 1980, 1982, 1987; Susskind and Ozawa 1984; Susskind and Cruikshank 1987). Further, most theorists have emphasized the general superiority of problem solving over other forms of conflict resolution, such as compromise or forcing (e.g., Filley 1975; Fisher and Ury 1981; Susskind and Cruikshank 1987). (Our problem solving variable measured the proportion of the time that problem solving was used in contrast to other conflict resolution methods, an approach which allowed us to specify the model.) We measured each of these four features, or variables, with a five-point Likert scale, though typically with different anchors. Although our measures obviously cannot capture the richness of these various concepts, at least they allow us to make gross quantitative judgments about their importance to planning practice across a set of actual cases.

The quality of the outcome was defined as the average of overall goal achievement and satisfaction with the outcome *from the lead organization's perspective.* Each variable was measured with a five-point Likert scale with differing anchors.

Table 1 **Variable Definitions**

Variable (Name Used in Tables)	Description and Coding Question
Outcome	
Success of Outcome (Outcome)	Average of overall goal achievement and satisfaction with outcome: (a) How successful was the project in achieving overall goals of the lead organization? (1 = No goals achieved, 5 = All goals achieved) and (b) How satisfied was the lead organization with the outcome? (1 = Totally dissatisfied, 5 = Totally satisfied).
Process	
Communications with Affected Groups (Communications)	How frequent were communications (reports, talks, letters, meetings, and so on) between the lead organizations and the other affected groups? (1 = Rare, 5 = Continuous).
Problem Identification Effort (Problem)	How extensive was the problem identification effort? (1 = No effort, 5 = Extensive and major effort).
Use of Problem Solving (ProbSolv)	Problem-solving methods attempt to achieve a high-quality solution that will benefit all parties involved. How frequently were problem-solving methods used to resolve conflicts regarding the preparation and implementation of the proposal? (1 = Never, 2 = About 25% of the time, 3 = About 50% of the time, 4 = About 75% of the time, 5 = About 100% of the time).
Solution Identification Effort (Solution)	How extensive was the search for possible solutions? (1 = No effort, 5 = Extensive and major effort).
Context	
Affected Groups' Activation (Activation)	Average of awareness of problem among potentially affected groups, priority given to problem by groups, and fraction of affected groups strongly concerned about problem: (a) How many of the potentially affected groups, including the lead organization, were aware of the problem? (1 = Only lead organization, 5 = All groups); (b) What priority was given to the problem by the potentially affected groups, including the lead organization, which were aware of the problem? (1 = High priority for no groups, 5 = High priority for all groups); and (c) How many of the potentially affected groups, including the lead organization, which were aware of the problem were strongly concerned about the problem? (1 = No groups strongly concerned, 5 = All groups).
Lead Organization Power (LOPower)	How powerful was the lead organization? (1 = No power, 5 = Extremely powerful).
Potential Impact on Organization Structures (PoImpactO)	How significant was the potential impact of the project on the organizational structure of the affected groups? (1 = No impact, 5 = Extensive and major reorganization required).
Potential Impact on Resources (PoImpactR)	How significant was the potential impact of the project on the resource allocation patterns within or among the affected groups? (1 = No change, 5 = Extensive and major impact).
Skill of Planning Staff (SkillPS)	How skilled was the planning staff? (1 = No skills, 5 = Very highly skilled).
Perceived Sophistication of Technology (TechSoph)	What was the level of technology perceived to be needed to solve the problem? (1 = Very simple technology, 5 = Highly sophisticated technology).
Conflict with Values of Affected Groups (ValueCon)	To what degree did the proposed project conflict with the values of potentially affected groups, including the lead organization? (1 = No conflicts, 5 = Conflict with values of all groups).

■ Hypothesized Effects of Context and Process on Process

We hypothesized that the extent of problem identification effort (referred to as "Problem" in the equation below) would depend on one other process variable and three context variables. Our hypotheses were

1. The use of problem solving (ProbSolv in the equation below) as a conflict resolution strategy should have a positive influence on problem identification effort, because people employing this strategy can be expected to work hard to clarify exactly what the problems are that need to be solved (Filley 1975; Dunn and Swierczek 1977; Fisher and Ury 1981; Morris and Hough 1986; Susskind and Cruikshank 1987).
2. The power of the lead organization (LOPower) should have a negative association with the problem identification effort. More powerful organizations may be expected to converge quickly on a few problems and problem definitions and other stakeholders may not be able to force those organizations to change

their positions (Pfeffer 1981; Bacharach and Lawler 1980; Susskind and Cruikshank 1987).
3. The more affected groups are activated (Activation) to participate in the process, the greater the problem identification efforts will be, since these groups will be able to force the lead organization to consider a variety of different problems and problem definitions (Freeman 1984; Susskind and Cruikshank 1987; Bryson 1988).
4. Finally, the skills of the planning staff (SkillPS) should be positively associated with problem identification efforts, since one of the things planning staffs are supposed to do is work toward thoughtful understandings and careful definitions of potential problems and solutions (Beckman 1964; Beneveniste 1972, 1989; Morris and Hough 1986).

Thus, the problem identification equation is

$$\text{Problem} = a_0 + a_1\ \text{ProbSolv} + a_2\ \text{LOPower} + a_3\ \text{Activation} + a_4\ \text{SkillPS} + e_1 \quad (1)$$
$$\text{H: } a_1, a_3, a_4 > 0$$
$$a_2 < 0.$$

Throughout the presentation of hypotheses, we present hypotheses concerning the signs of parameters. For example, in Equation (1), the parameters (a_1 to a_4) can be interpreted as the expected change in the dependent variable (extent of problem identification effort) given a one-unit change in the applicable independent variable (ProbSolv, and so on), holding changes in the other independent variables constant. The hypotheses are interpreted as, for example, a one-unit change in ProbSolv will result in an a_1 unit change in Problem and if the change in ProbSolv is positive the change in Problem will also be positive. Alternatively, because a_2 is hypothesized to be negative, a one-unit increase in LOPower is hypothesized to result in a reduction in Problem of size a_2. Thus, this equation hypothesizes that increases in the use of problem solving as a conflict resolution strategy, the level of activation of affected groups and the skills of the planning staff will increase the level of problem identification effort and that increases in the power of the lead organization will reduce problem identification effort. The intercept, a_0, indicates the level of problem identification effort that would be found if all the other variables equaled zero. Because the equation will not perfectly explain the level of problem identification effort, an error term, e_1, is included. The error term is assumed to have a normal distribution with mean zero. The hypotheses presented for the other equations and the intercepts and error terms should be interpreted in a similar manner.

We hypothesized that the extent of solution identification effort (Solution) also would depend on one process variable and three context variables. Our hypotheses were as follows:

1. The extent of problem identification effort (Problem) should have a positive influence on solution identification effort. Substantial efforts at problem identification should create a demand for comparable solution identification efforts, so that people can be assured that agreed-upon problems are adequately addressed (Dunn and Swierczek 1977; Fisher and Ury 1981; Susskind and Cruikshank 1987).
2. A perception at the beginning of the project that sophisticated technology (TechSoph) is required to solve the problem should increase solution search efforts, as technically sophisticated solutions are less likely to be readily available than less sophisticated solutions (Sapolsky 1972; Wolman 1981; Morris and Hough 1986).
3. The power of the lead organization (LOPower) should have a negative association with the extent of solution identification effort. The more powerful the lead organization, the less likely it is to assume it needs a large menu of alternatives to satisfy the desires of other stakeholders (Pfeffer and Salancik 1978; Pfeffer 1981; Susskind and Cruikshank 1987).
4. And finally, the skills of the planning staff (SkillsPS) should have a positive association with the extent of solution identification effort, since one of the functions of a skilled planning staff is to make decision makers aware of alternative solutions, not just the first feasible option (Bryson and Delbecq 1979; Morris and Hough 1986).

Thus, the solution identification effort equation is

$$\text{Solution} = b_0 + b_1\ \text{Problem} + b_2\ \text{TechSoph} + b_3\ \text{LOPower} + b_4\ \text{SkillPS} + e_2 \quad (2)$$
$$\text{H: } b_1, b_2, b_4 > 0$$
$$b_3 < 0.$$

This equation hypothesizes that increased problem identification efforts, technical sophistication of the needed technology, and skills of the planning staff will increase the solution identification effort, while increased power of the lead organization will reduce such effort. The parameters (b_1 to b_4) can be interpreted as the expected change in the dependent variable (extent of solution identification effort) given a one-unit change in the applicable independent variable (Problem, and so on), holding changes in the other independent variables constant. The intercept, b_0, indicates the level of problem identification effort that would be found if all the other variables equaled zero, and e_2 is an error term that is assumed to have a normal distribution with mean zero.

We believed the frequency of communication (Communications) between the lead organization and other affected groups would depend on two process and two context variables. Our hypotheses were as follows:

1. The use of problem solving (ProbSolv) as a conflict resolution strategy should have a positive influence

on communication since problem-solving strategies are likely to require high levels of communication (Folger and Poole 1984; Susskind and Cruikshank 1987).
2. The extent of problem identification effort (Problem) should increase the frequency of communication since a primary mechanism for problem identification is communication with affected groups (Folger and Poole 1984; Morris and Hough 1986; Susskind and Cruikshank 1987).
3. Activation of the affected groups (Activation) should increase the level of communication, since such groups will request — if not demand — communication (Freeman 1984; Susskind and Cruikshank 1987).
4. Finally, the power of the lead organization (LOPower) should negatively influence the level of communication. Highly powerful organizations are more able to act unilaterally without consultation (Pfeffer and Salancik 1978; Pfeffer 1981; Susskind and Cruikshank 1987).

The frequency of communication equation therefore is

$$\begin{aligned} \text{Communications} = {} & c_0 + c_1\ \text{ProbSolv} + c_2\ \text{Problem} \\ & + c_3\ \text{Activation} + c_4\ \text{LOPower} + e_3 \\ & \text{H: } c_1, c_2, c_3 > 0 \\ & \quad c_4 < 0. \end{aligned} \tag{3}$$

The equation hypothesizes that increased use of problem solving as a conflict resolution strategy, problem identification effort, and activation of affected groups will increase the frequency of communication between the lead organization and the other affected groups. It also hypothesizes that increased power of the lead organization will reduce the frequency of communication. As in the other equations, a constant (c_0) and error term (e_3) are included.

We thought the use of problem solving as a conflict resolution strategy (ProbSolv) would depend on one process variable and five context variables. We were guided by the following hypotheses:

1. Frequent communication (Communications) among the lead organization and affected parties should encourage problem solving strategies, as such communication provides the occasion for extensive exploration of problems and solutions in search of possible all-gain solutions (Folger and Poole 1984; Morris and Hough 1986; Susskind and Cruikshank 1987).
2. The more the proposed project conflicts with the existing values of the affected groups (ValueCon), the more likely problem solving would be used to reconcile the conflicting values. In such cases, problem solving might be expected to be the only conflict resolution strategy likely to produce satisfactory outcomes (Fisher and Ury 1981; Wolman 1981; Susskind and Cruikshank 1987).
3. The extent of problem-solving activity also might be expected to increase as affected groups become more activated (Activation), because groups can be expected to have differing interests and values and problem solving is likely to be the only conflict resolution strategy capable of reconciling these differing interests and values (Fisher and Ury 1981; Susskind and Cruikshank 1987).
4. The extent of problem-solving activity also should increase as the potential impact of the project increases on the organizational structures of affected groups (PoImpactO) (Zaltman, Duncan, and Holbek 1973; Susskind and Cruikshank 1987).
5. Similarly, the extent of problem-solving activity should increase as the potential impact of the project increases on the resource allocation patterns of affected groups (PoImpactR) (Zaltman, Duncan, and Holbek 1973; Susskind and Cruikshank 1987).
6. On the other hand, we hypothesized that the use of problem solving would decrease when the power of the lead organization (LOPower) increased. Powerful organizations would be able to act more unilaterally than less powerful organizations (Bacharach and Lawler 1980; Pfeffer 1981; Susskind and Cruikshank 1987).

The problem-solving equation thus is

$$\begin{aligned} \text{ProbSolv} = {} & d_0 + d_1\ \text{Communications} + d_2\ \text{ValueCon} \\ & + d_3\ \text{Activation} + d_4\ \text{PoImpactO} \\ & + d_5\ \text{PoImpactR} + d_6\ \text{LOPower} + e_4 \\ & \text{H: } d_1, d_2, d_3, d_4, d_5 > 0 \\ & \quad d_6 < 0. \end{aligned} \tag{4}$$

The equation hypothesizes that increases in the frequency of communication between the lead organization and other affected groups, the degree of conflict over values, the level of activation of affected groups, and the level of potential impact on organization and resources will all increase the use of problem solving as a conflict resolution strategy. It also hypothesizes that increased power of the lead organization will decrease the use of problem solving as a conflict resolution strategy. As in the other equations, a constant (d_0) and error term (e_4) are included.

■ Hypotheses Relating Context and Process to Outcomes

We hypothesized that the quality of the outcome would be a function of all four process variables and all seven context variables. The quality of outcome was defined as the average of overall goal achievement and satisfaction with the outcome from the lead organization's perspective (Outcome). For reasons outlined above, we believed outcome quality would *increase* in response to *higher values* of the following measures:

1. The use of problem solving (ProbSolv) as a conflict resolution strategy (Dunn and Swierczek 1977);

2. The extent of communication (Communications) between the lead organization and the affected groups (Morris and Hough 1986);
3. The extent of problem identification effort (Problem) (Huber 1980; Wolman 1981);
4. The extent of solution identification effort (Solution) (Huber 1980; Wolman 1981);
5. The power of the lead organization (LOPower), because it would be able to implement agreed-upon solutions (Pfeffer and Salancik 1978; Pfeffer 1981); and
6. The skills of the planning staff (SkillsPS) (Bryson and Delbecq 1979; Morris and Hough 1986).

In other words, desirable outcomes should increase to the extent that problems and solutions have been effectively identified, important stakeholders have been communicated with, and the lead organization has the power and staff to facilitate pursuit of the project from start to finish.

On the other hand, we hypothesized the quality of the outcomes would *decrease* as a function of *increased values* for the following variables:

1. The level of activation of affected groups (Activation), as it might be very difficult to satisfy highly activated groups (Freeman 1984; Nutt and Backoff 1987; Bryson 1988);
2. The *a priori* perceived technical sophistication of required solutions (TechSoph) as technically difficult solutions are typically difficult to implement (Bryson and Delbecq 1979; Wolman 1981);
3. The potential impact on the organizational structures of affected groups (PoImpactO), as organizational redesigns can be difficult to implement (Wolman 1981; Calista 1986);
4. The potential impact on the resource allocation patterns of affected groups (PoImpactR), as reallocation of resources also can be difficult to implement (Wolman 1981; Calista 1986); and
5. Value conflict (ValueCon), as high levels of conflict reduce the possibility of desirable outcomes (Wolman 1981; Folger and Poole 1984; Morris and Hough 1986).

The outcome equation therefore is

$$\begin{aligned} \text{Outcome} = {} & f_0 + f_1\ \text{ProbSolv} + f_2\ \text{Communications} \\ & + f_3\ \text{Problem} + f_4\ \text{Solution} + f_5\ \text{LOPower} \\ & + f_6\ \text{SkillPS} + f_7\ \text{Activation} + f_8\ \text{TechSoph} \\ & + f_9\ \text{PoImpactO} + f_{10}\ \text{PoImpactR} \\ & + f_{11}\ \text{ValueCon} + e_5 \\ & \text{H: } f_1, f_2, f_3, f_4, f_5, f_6 > 0 \\ & \quad f_7, f_8, f_9, f_{10}, f_{11} < 0. \end{aligned} \tag{5}$$

The equation hypothesizes that increases in the variables associated with f_1 to f_6 will have positive influences on the outcomes and that increases in the variables associated with f_7 to f_{11} will have negative influences on the outcomes. As in the other equations, a constant (f_0) and error term (e_5) are included.

■ Data Sources

In order to estimate the model, we needed measures for all of the variables for a large number of projects. We were neither able to negotiate access to a large number of projects, nor did we have funding to collect the data even if access were obtained. We were able, however, to obtain data coded from secondary sources. The data were coded as part of a course requirement in a master's level project planning course taught by the first author.

The data were derived from fifty-nine recorded cases of major attempts to produce planned change. The specific cases used were first suggested by teams of master's students to the first author and subsequently approved by him for use. The criteria for selection were as follows: (1) the case had to be prepared in a professional manner by academics, journalists, and/or project participants; (2) the project had to have reached completion, whether successfully or not; (3) the record had to include sufficient detail to allow for informed judgments about all variable values. As noted in the introduction, the definition of "project" used for purposes of this study was quite broad and denoted focused efforts to produce a major organizationally- or community-based change (see Author's Note).

A brief review of some of the cases will give the reader a better feel for the kinds of projects included and the nature of the data available for coding. Many cases will be quite familiar to many readers. For example, "A Plan for Central Minneapolis," "A Land Use Plan for St. Paul," "Location of the Inner City Freeway," and "The Ancker Hospital Site Controversy" are all included from Alan Altshuler's (1965) classic, *The City Planning Process: A Political Analysis.* Other classics include Stephen Bailey's (1950) *Congress Makes a Law: The Story Behind the Employment Act of 1946,* Martin Meyerson and Edwin Banfield's (1955) *Politics, Planning and the Public Interest: The Case of Public Housing in Chicago,* Daniel P. Moynihan's (1970) *Maximum Feasible Misunderstanding,* Graham Allison's (1971) *The Essence of Decision: Explaining the Cuban Missle Crisis;* and Charles Harr's (1975) *Between Idea and Reality: The Origin, Fate, and Legacy of the Model Cities Program.* Other cases are not classics, but still are remarkably interesting and well-told stories, such as: David McCullough's (1972, 1978) *The Great Bridge,* the story of the building of the Brooklyn Bridge, and *The Path between the Seas,* the story of the construction of the Panama Canal; Eric Redman's (1973) *The Dance of Legislation;* Ernest Alexander and Robert Beckley's (1975) *Going It Alone: A Case Study in Planning and Implementation at the Local Level;* Richard Neustadt and Harvey Fineberg's (1978) *The Swine Flu*

Affair: Decision-Making on a Slippery Disease; and Amy Klobuchar's (1982) *Uncovering the Dome,* a history of the planning and construction of a major sports stadium in Minneapolis, Minnesota. Other cases are less widely circulated, yet still useful project histories. Virtually all of these cases involve what most observers probably would agree are "major" projects; that is, deliberate efforts to plan for and implement major departures from the status quo.

A statistical profile of the cases will further clarify the nature of the data set. First, the type of lead organization varied considerably. Allowing for some double counting where cases fall into more than one category, the lead organizations were as follows: (1) the federal government and its agencies, excluding the Department of Defense, 31%; (2) state or local governments, 58%; (3) corporations, 8%; (4) the Department of Defense, 7%; and (5) other organizations, such as private, nonprofit organizations, 10%.

Second, the type of project also varied considerably. Again, allowing for double counting where cases fall into more than one category, the cases were of the following types: (1) establishment of new programs, or new facilities for existing programs, 46%; (2) changes in current programs or organizational designs, 27%; (3) specific construction projects, 27%; (4) new legislation, 20%; (5) traditional urban planning projects, such as the preparation of land use or transportation plans, 20%; (6) organizational engagements in international relations, 7%; and (7) other cases, 2%.

Third, the years covered by the projects also varied. Allowing for double counting where cases spanned more than one time period, the cases occurred in the following years: (1) before 1960 (mostly in the 1950s), 39%; (2) the 1960s, 46%; (3) the 1970s, 29%; and (4) the 1980s, 7%.

The diversity of cases can be seen either as a strength or a drawback of the design. If the relations studied vary across case contexts in ways not accounted for by the model, and such variation is independent of the context variables included in our model, then the likelihood of finding significant relationships is reduced. In other words, if the true model or parameter values for differing planning contexts differ in ways not captured by the model and not related to the variables in the model, then the parameter estimates for the variables included should tend to be near zero. If, on the other hand, the relations vary across contexts in ways not captured by our model, and the variance across contexts is statistically associated with the variables that are included in the model, inconsistent parameter estimates will be obtained. We are guided by the assumption that the most likely outcome of including a diverse set of lead organizations, projects, and time frames is a reduction in our ability to fit the model. Therefore, if statistically significant relationships *are* found, it suggests to us that they are quite robust.

■ Coding Procedures

The student coders were grouped into teams of three to five (typically four or five) to select a case for analysis and to gain approval of the case from the first author. Prior to coding the approved case, each student would have (1) participated in extensive classwork and discussions on project planning, including context, process, and outcome concepts; (2) practiced analyzing four smaller cases; (3) practiced coding one of the four smaller cases; and (4) participated in class discussions of, and received instructor feedback on, the case analyses. Each student was instructed to analyze and code the approved case individually and without discussing his or her answers with other team members (see Author's Note). Ten percent of each student's grade depended on competent completion of the coding assignment.

One case was dropped from the analysis due to low inter-coder reliability scores (Cronbach's alpha below 0.5). For one case Cronbach's alpha could not be calculated because only two coders completed questionnaires satisfactorily; however, visual inspection of the two questionnaires revealed a high level of inter-coder agreement.

In spite of the typically high inter-coder reliability scores, the coding procedures may limit the validity of this study. Ideally, a single set of trained coders who have no understanding of the theory and no interest in potential implications of the study would code all the cases. In theory, having a single set of coders code all cases would tend to increase the consistency of judgments across cases. Having coders who do not understand the theory and who have no interest in the subject would reduce the danger that they would impose their own expectations or preferences on the relations studied rather than simply reflecting the case as presented.

Several considerations influenced our decision to settle for less than the ideal, including the absence of substantial research funding and the mass of material to be coded. Many of the cases were several hundred pages in length, and altogether they account for over 10,000 pages of material. In addition, given very complex material, it is not clear that a totally naive coder will give more accurate interpretations than a more experienced, but less disinterested, coder. Given the size of the material to be coded, using multiple coders interested in, and with some knowledge of, project planning appeared to be the only feasible approach.

Although a number of potential threats to the validity of the data have been identified, many of these are inherent in any study of planned change. It is not easy to imagine a truly random sample of project planning cases. Further, it is hard to imagine coders who would not read cases without forming some beliefs about what caused what. Indeed, almost all cases were written in "this caused that" terms. We therefore cannot guarantee

that the cases examined are representative of some general class of project planning cases, nor can we guarantee that the coders' or case writers' implicit or "espoused theories" (Argyris and Schon 1974) have not influenced the translation from the real events in the field to the data developed for analysis.

One final note on coding relates to the definition of "lead organization" for the purpose of this study. The student raters who translated the qualitative data from the cases into numerical data were asked to identify the "lead organization" and to make judgments regarding outcomes "from the lead organization's perspective." The raters, however, were told that the term "lead organization" in the questionnaire always should be interpreted as the organization, or part of an organization, charged with carrying out the change effort. Hence, the action unit in specific cases might not be a whole organization. Added complexity arises from the fact that each "action unit" always was part of a larger network of actors with a stake in the outcome of the change efforts. We are thus mixing levels of analysis in our study (i.e., suborganizational, organizational, and interorganizational), but argue, in the same vein as White (1974), that when planning and decision making are the focus of attention, separate intraorganizational, organizational, and interorganizational frameworks are not necessary or desirable, as these processes typically are designed to bridge levels.

■ Estimating the Model

The model itself is a simultaneous equation system and was consequently estimated by using a three-stage least squares regression analysis, which provides consistent parameter estimates (Johnston 1984). The outcome equation was recursive (the outcome variable was influenced by the other endogenous variables but did not influence them) and consequently was estimated independently by ordinary least squares regression analysis. The parameter estimates appear in Table 2.

Three-stage least squares is a statistical technique for estimating sets of regression equations where the dependent variable in one or more equations is an independent variable in another equation, and vice versa. For example, in the model presented above the use of problem solving as a conflict resolution technique influences communications and the amount of communications influences the use of problem solving as a conflict resolution technique. This violates an assumption of conventional regression analysis because the errors in the equations will be correlated with the regressors. That is, the error term in the communications equation will be correlated with problem solving and the error term in the problem-solving equation will be correlated with communications. This results in biased and inconsistent parameter estimates using ordinary least squares. Three-stage least squares is an asymptotically-efficient, consistent estimator for such models (Johnston 1984).

Table 2 Model Estimation Results[a]

Problem = 3.33*** − .558 ProbSolv − .388** LOPower (1)
(1.04) (.388) (.186)
+ .437* Activation + .700*** SkillPS
(.249) (.257)

Solution = 1.36 + .471 Problem + .197** TechSoph (2)
(1.01) (.353) (.084)
+ .056 LOPower + .349 SkillPS
(.136) (.221)

Communications = − .598 + .605*** ProbSolv + .505* Problem (3)
(.952) (.211) (.288)
− .345* Activation + .373*** LOPower
(.191) (.134)

ProbSolv = − .151 + .884*** Communications − .260* ValueCon (4)
(.953) (.301) (.150)
+ .253* Activation + .029 PoImpactO − .126 PoImpactR
(.148) (.072) (.082)
− .331** LOPower
(.135)

Outcome = − 2.30** + .355 ProbSolv + .051 Communications (5)
(1.18) (.219) (.203)
+ .428** Problem − .104 Solution + .087 LOPower
(.204) (.220) (.188)
+ .036 SkillPS + .162 Activation − .051 TechSoph
(.221) (.220) (.160)
− .059 PoImpactO − .323* PoImpactR − .240 ValueCon
(.158) (.185) (.222)

N = 58 R^2 = .47 F(11, 46) = 3.68 p <.001
* p < .10 ** p < .05 *** p < .01

■ Note
a. Standard errors appear in parentheses under parameter estimates.

■ Results

Each equation will be discussed in turn. The parameters can be interpreted as the expected change in the dependent variable for a one-unit change in the independent variable, holding the other variables in the equation constant. For example, a parameter of .5 indicates that a one-unit change in the independent variable will result in a .5 increase in the dependent variable. Since these parameter estimates come from a complete system estimation of the model, a given variable may influence a second variable both *directly* (when it appears in an equation where the second variable is the dependent variable) and *indirectly* (by influencing variables that in turn influence the second variable).

Problem Identification

In the problem identification equation (1), there are three statistically significant parameter estimates and each is in the hypothesized direction: the more powerful the lead organization, the less likely it was to engage in extensive problem identification efforts. The more activated the affected groups, the greater the problem identification effort. And the more skilled the planning staff, the greater the problem identification efforts.

Solution Search

In the solution search equation (2), only the *a priori* perceived technical sophistication of the needed solution had a statistically significant parameter estimate. As hypothesized, the greater the *a priori* perceived technical sophistication of needed solutions, the more likely lead organizations were to engage in extensive search efforts.

Communications

In the communications equation (3), the use of problem solving as a conflict resolution strategy and the extent of problem identification effort each increased the frequency of communication between the lead organization and affected groups, as hypothesized. On the other hand, increased power of the lead organization had a positive effect on communication with affected groups, while increased activation of affected groups had a negative impact. These two relationships were in the opposite direction from the hypotheses. What these relationships suggest is that (1) strong organizations feel secure enough to communicate with affected groups, while weak organizations do not; and (2) lead organizations appear to avoid communication when affected groups are highly activated. Lead organizations speak most to affected groups when the lead organization is powerful and the affected groups are not activated, and lead organizations communicate least when they are less powerful and the affected groups are highly activated.

Problem Solving As a Conflict Resolution Strategy

Equation (4) explains the use of problem solving as a conflict resolution strategy. Significant positive relationships — in the hypothesized direction — were found for communication and activation of affected groups. The use of problem solving becomes more likely when the frequency of communication increases between the lead organization and affected groups, and when the affected groups are highly activated. Contrary to the hypothesis, the level of value conflict reduces the use of problem solving. When there are high levels of conflict among affected groups and the lead organization, the lead organization appears to try to force or compromise to obtain a solution. High levels of value conflict, in other words, may make problem solving very difficult.

Outcomes

Finally, in the outcome equation (5), the extent of problem identification efforts was positively and significantly associated with success, while the potential impact on resource allocation patterns was negatively and significantly associated with success. The positive impact of the extent of problem identification efforts was expected; that is, we hypothesized that the more effort that goes into assuring that the problems have been properly identified, the more likely satisfactory outcomes will be achieved. The negative impact on success of potential impact on resources also was expected, and is consistent with an argument that major reallocations of resources are extremely difficult. The parameter on the use of problem solving as a conflict resolution strategy was large, positive, in the hypothesized direction, and close to statistically significant ($p = .11$). That is, our hypothesis that heightened efforts to find "all-gain" solutions would pay off in better outcomes was quite close to being supported. All the other parameter estimates were statistically insignificant.

We thought that the insignificant parameter estimates in the outcome equation might result from the relatively small sample size and the covariances established among these variables in the previous estimates. To test this possibility, we first determined whether the process variables which were individually insignificant collectively had a significant influence on outcomes. Then we determined whether the context variables which were individually insignificant collectively had a significant influence on outcomes.

In other words, we first executed a joint test of the hypothesis that the parameters on problem solving as a conflict resolution strategy, communications, and the extent of solution search equaled zero. We cannot reject the hypothesis that these three variables have parameters equal to zero [$F(3, 46) = 1.13$, $p = .35$] — that is, they appear to have no influence on the outcome. Likewise, we tested the hypothesis that the individually insignificant context variables (activation, technical sophistication, value conflict, potential impact on organization structures, lead organization power, and skills of the planning staff) had parameters equal to zero. We cannot reject the hypothesis that these six context variables all have parameters equal to zero [$F(6, 46) = .685$, $p = .66$] — that is, they appear to have no influence on the outcome.

The parameter on problem solving as a conflict resolution technique became statistically significant when the previously insignificant context variables were constrained to zero. Since the previous tests were insignificant, we tried constraining all the previously insignificant context *and* process parameters to zero and again were unable to reject the null hypothesis [$F(9, 46) = 1.49$, $p = .18$]. Thus, we cannot reject the hypothesis that the three insignificant process variables *and* the six

insignificant context variables all have parameters equal to zero — that is, they appear to have no influence on the outcome.

Nevertheless, because the use of problem solving as a conflict resolution technique had been almost significant in the original estimates, and was quite significant when the insignificant context variables were constrained to zero, we tested a model that constrained all the previously constrained variables to zero versus one where problem solving was unconstrained. Here a significant difference was found [$F(1, 54) = 9.16$, $p < .01$]. Thus, it appears that the use of problem solving for conflict resolution *does* influence the outcome; its statistical significance was reduced in the original estimates by the seven other variables that appear to have no direct influence on the outcome.

Although the significance levels of these tests must be viewed with caution (because the serial tests are not totally independent), this analysis suggests that the primary direct effects on the outcome are the extent of problem identification effort, the potential impact on resource allocation patterns, and the use of problem solving as a conflict resolution technique. The regression with these three independent variables had an R^2 of .41 compared to the R^2 of .47 when all eleven independent variables were entered. In other words, greater goal achievement and satisfaction with the outcome of the planned change efforts (from the standpoint of the lead organization) are likely to increase to the extent that (1) more effort has gone into the identification of the problems to be solved, (2) greater efforts are made to find an "all-gain" solution to the problems, and (3) less is at stake in terms of potential impacts on resource allocations among involved or affected parties.

■ Discussion

Figure 1 diagrams the connections in the model that had significant parameter estimates, and therefore provides a context within which to interpret the *system* of statistically significant connections. (Of course, not having significant parameter estimates in a given data set does not imply a factor is not important, but rather that its importance cannot be demonstrated with this model and data set.) Several observations seem warranted.

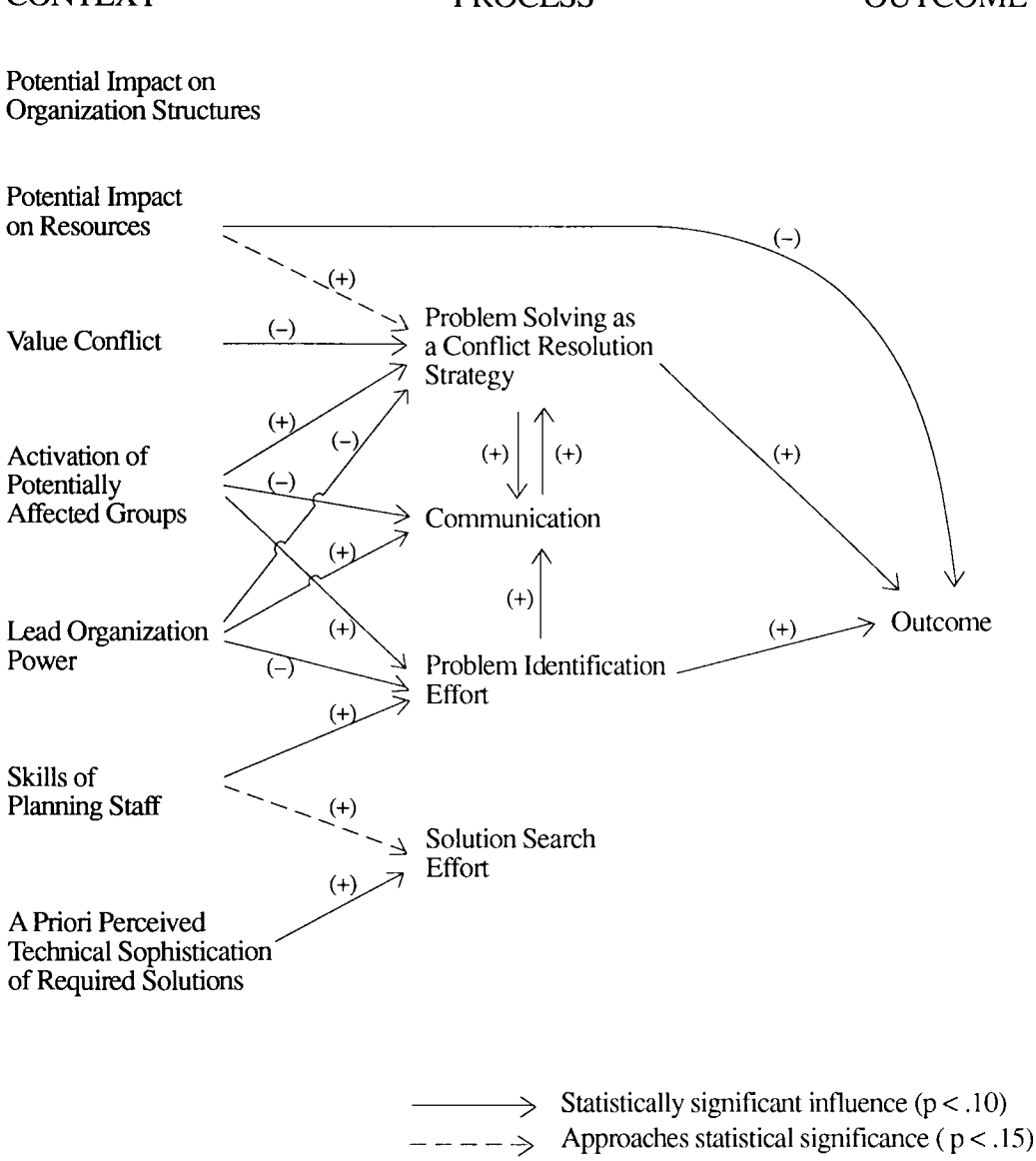
First, context does affect both process and outcomes. For example, although the power of the lead organization does not appear to influence the quality of the outcome directly, it does influence outcomes indirectly through the use of problem solving to resolve conflicts, the extent of problem identification efforts, and the amount of communication between the lead organization and affected groups. There are theoretical, methodological and practical implications to be drawn from these results. *Theoretically,* the results provide empirical support for a *contingent* approach to the planning process: context makes a difference in the appropriate choice of planning processes in order to achieve desirable outcomes. *Methodologically,* simultaneous equation models are to be preferred to bivariate analysis and single-equation regression analyses, which would have obscured the structure of context-process-outcome relationships (cf. Boal and Bryson 1987). *Practically,* people interested in successful planning and implementation of major changes from the status quo must pay attention to the context of the change effort and seek to tailor their change process to that situation in order to increase the likelihood of successful outcomes.

Second, effort expended on the identification of the problems to be solved appears to be worthwhile. If you do not know what the problem is, it appears unlikely you will solve it (Ackoff 1979). Third — and an interesting contrast to our second point — the amount of effort expended on searching for solutions does not seem to matter much. What matters most is whether or not you have identified the problems that need to be solved, not whether you have expended effort on searching for solutions to problems that may or may not need to be solved. Alternatively, the way you frame a problem probably predetermines much of the solution to the problem (Cartwright 1973).

Fourth, problem solving as a conflict resolution strategy appears to be clearly preferable to compromise (i.e., no party gets all of what it wants) or forcing solutions on people against their wills. This finding has emerged in small group research before (Folger and Poole 1984), but our study appears to be one of the first to demonstrate the point quantitatively using a large sample of major planned change efforts. Problem solving appears to be especially important when it comes to handling highly activated, involved parties — although even problem solving is no panacea when it comes to severe value conflicts. Further, problem solving appears to be enhanced by heightened levels of communication. Lead organizations thus appear to do best — from their own perspective — when they engage in "problem solving" and rely on frequent communications with other affected groups, particularly when highly activated parties are involved (Kanter 1983; Susskind and Cruikshank 1987).

Fifth, the absolutely critical role for planners appears to be the efforts they make to identify exactly what the problems are that need to be solved. Problem identification efforts then *directly* affect outcomes — and *indirectly* affect outcomes through heightened communication and use of problem solving as a conflict resolution strategy. Our study therefore is consistent with others that have shown that key planning skills include the ability to think, analyze and synthesize data, communicate effectively, and engage in constructive conflict resolution strategies (Schon et al. 1976; Hemmens et al. 1978; Susskind and Ozawa 1984; Forester 1987). These skills are necessary for effective problem identification in complex situations.

Figure 1 **Statistically Significant Relations among Context, Process, and Outcome Variables**



Finally — and perhaps ironically — powerful lead organizations must be very careful about how they use their power if they wish to achieve their goals and be satisfied. Powerful lead organizations are likely to expend less effort on problem identification and make less use of problem solving as a conflict resolution strategy — which in turn are likely to mean less favorable outcomes *from their own perspective.* On the other hand, powerful organizations may have two saving graces. The first appears to be their willingness to talk with affected groups when they may not have to — because this communication is likely to lead to greater use of problem solving and thus better outcomes. The second is perhaps the willingness of powerful organizations to hire skilled planners, who are likely to engage in greater problem identification efforts, which will lead both directly and indirectly to better outcomes. Good planners thus *may* be able to help powerful organizations avoid the improper exercise of power and tragic mistakes (Forester 1982; Tuchman 1984).

■ Conclusions

Several tentative conclusions seem warranted based on this study. The conclusions must be viewed as tentative because of the challenges to the reliability and validity

of our data noted earlier. First, planning — as defined in this study — appears to make a rather dramatic positive contribution to the outcomes of major planned change efforts. Skilled planners also make a significant positive contribution to project planning success. Our study thus is one of the few that provides large-sample, quantitative, empirical support for the view that planning and planners can make a substantial positive contribution to the creation of desirable outcomes in major projects.

Second, the fact that planning as defined has such an apparent powerful impact on producing desirable outcomes across such a wide variety of cases should be quite encouraging to planners. The activities that made a difference — problem identification efforts, communication, and efforts to find all-gain solutions — are skills that can be learned and utilized (Huber 1980; Whetten and Cameron 1984; Johnson and Johnson 1987; Susskind and Cruikshank 1987; Benveniste, 1989).

Third, powerful organizations must be very careful to fight their normal tendencies to short-circuit problem identification efforts and to not work for "all-gain" solutions. Both of these tendencies are likely to result in failed project planning efforts. Greater communication with affected parties and reliance on a skilled planning staff are two things powerful lead organizations can do to help avoid such failures.

Fourth, while acknowledging all of the reliability and validity problems involved in using students as analysts of recorded cases of planned change, we think that useful contributions to the planning literature can be made through studies and methods similar to this one. Conducting empirical research on a large sample of planned change efforts is extremely expensive and time-consuming work, a situation that has contributed to the paucity of studies that advance our knowledge of what works and what does not when it comes to planning and planners' actions. The present study obviously is not without problems, but at least it offers a study of fifty-eight cases of planned change that was made possible on cost- and time-saving grounds through the use of student analysts (cf. Dunn and Swierczek 1977; Nutt 1984).

Finally, this study implies that we need both theoretical reformulations of the planning process and more empirical studies to determine which planning processes work, under which circumstances, and why. We have argued that context, process, and outcome variables must be considered. And we have been able to show direct and indirect relationships between context and/or process variables and outcomes. And we have been able to show that planning as defined and skilled planners can make a significant positive difference. But there are a number of other ways to conceptualize planning; and context, process, and outcome variables may relate in a number of more complicated ways not explored in this study (Boal and Bryson 1987). Clearly more theoretical and empirical work is needed so that we can better understand planning and make better prescriptions (Kaufman 1987, 108-109; Dalton 1989). The rewards, we believe, will be two-fold. First, we can expect significant improvements in the planning and implementation of major projects. And second, as a result, we will have a much stronger empirical basis for the defense of planning and planners. As Klosterman (1985), for example, notes, theoretical arguments in support of planning will count for little if they are not buttressed by practical results.

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For the list of cases studied, the questionnaire used, the inter-coder reliability scores, and other study data, write to John M. Bryson at the Hubert H. Humphrey Institute of Public Affairs, University of Minnesota, Minneapolis, MN 55455. □

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