In Search of Rationality: The Purposes behind the Use of Formal Analysis in Organizations

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This paper describes the results of a study that examines how formal analysis is actually used in practice in three different organizations. Four main groups of purposes for formal analysis—information, communication, direction and control, and symbolic purposes—are identified and related to the nature of the social and hierarchical relationships between those who initiate analysis, those who do it, and those who receive it. It is concluded that, far from being antithetical as often assumed, formal analysis and social interaction are inextricably linked in organizational decision making and that different structural configurations may generate different patterns of use of analysis.•

INTRODUCTION

Management teachers, writers, and researchers spend a good deal of time advocating more formal, more systematic, more logical, and more analytical approaches to decision making. However, in spite of all this normative emphasis on the use of formal analysis, surprisingly little is actually known about how it is used in practice in organizations, especially at the top-management level. Is it in fact used at all? And if so, when and why?

Much of the management writing and teaching aimed at practitioners emphasizes the use of formal analysis for informational purposes. Yet, anyone who has ever worked in a complex organization knows that other types of motivations for doing analysis are also common. Many have in fact been noted in the scholarly literature. For example, Dalton (1959) suggested that staff people in the firm he studied often served a control function. Others (e.g., Bower, 1970; Kerr, 1982; Meyer, 1984) have noted that a great deal of formal analysis is more concerned with the justification of decisions already made than with a need to know. Quinn (1980) suggested that formal analysis and planning may have an important role to play in focusing the attention of others on issues, raising comfort levels, and gaining commitment. Lindblom and Cohen (1979), Porter, Zemsky, and Oedel (1979), Prince (1979), and Wildavsky (1979) have suggested that formal analysis is often used as a tool in adversarial debate. Brewer (1981) and Meltsner (1976) described how analysis may be used to deflect attention away from issues by giving the impression of action. Edelman (1985), Feldman and March (1981), Meyer and Rowan (1977), and Pfeffer (1981) drew attention to the symbolic and ritualistic uses of language and information in conveying messages of rationality and thus legitimizing organizational actions. However, these contributions are fragmented. There has, in fact, been very little empirical research that has examined the purposes behind formal analysis in any systematic way. This paper describes some of the results of an exploratory empirical study in which the purposes behind the use of formal analysis in three organizations were systematically identified and a typology was developed.

Biases in favor of considering formal analysis mainly as a source of information have also led to another frequent conception: that an organization in which formal analysis is very common is also an organization that has adopted a "rational/

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comprehensive'' mode of decision making and one in which political and social interactive modes of decision making are relatively less important. For example, this assumption partly underlies Fredrickson's (1984) definition of the ''comprehensiveness'' construct. And Mintzberg (1979b) explicitly associated formal analysis with the ''machine bureaucracy'' structural type, in which political modes of decision making are relatively unimportant as compared with other structures. In the study described here, it is noted that, far from being antithetical, formal analysis and social interaction are inextricably linked in organizational decision making. Several propositions concerning the relationships between the use of formal analysis and its social interactive context are offered.

As the subject of this research had been very little studied in the past, a qualitative research approach, emphasizing richness of the data base, seemed appropriate: description, concept development, and hypothesis generation were more important than hypothesis testing at this stage. I therefore decided to focus on understanding the role of formal analysis in strategic decision making in three organizations in depth. The general approach taken reflects that proposed by Glaser and Strauss (1967) for the development of ''grounded theory'' and the ''direct research'' approach advocated by Mintzberg (1979c). A very rich data base was therefore developed, with the use of multiple data sources providing some assurance that a complete and accurate picture of the decision-making processes was obtained. However, the study does suffer from the familiar and somewhat inevitable limitations usually associated with this kind of qualitative research. One of these limitations is related to the small sample size: caution is required in generalizing the results, especially those in which the three organizations are compared. The second limitation of this type of research is perhaps more serious: data analysis relies greatly on the perceptions of one researcher. The problem is aggravated by the data themselves, which are verbal and therefore ambiguous. Two measures have been taken in an attempt to alleviate this problem at least partially. First, within the limits of available space, I have tried to expose the reader directly to the flavor of the raw data by examples and by using quotations from interviews to illustrate my points. Secondly, where possible, for certain key variables, two coders were involved in evaluating the data and an attempt was made to verify the reliability and the robustness of the results.

METHOD

The three organizations studied were deliberately chosen to represent three different structural types, according to Mintzberg's (1979b) typology: one machine bureaucracy, one professional bureaucracy, and one adhocracy. Given that several authors have suggested that different organization structures may produce different types of decision-making processes (e.g., Mintzberg, 1979b; Shrivastava and Grant, 1985; Fredrickson, 1986), three types of organizations were chosen for study, to enrich the data base, to provide exposure to as many different types of uses of formal analysis as possible, and also to enable me to make some preliminary comparisons between the different structures. The machine bureaucracy

(Mintzberg, 1979b) is a type of organization in which coordination is principally achieved by the standardization of work processes. Operating work in these organizations is stable, predictable, and well understood and is carried out by relatively unskilled personnel. The machine bureaucracy chosen (called here "Servico") operated a public service that satisfactorily filled this description.[1] The "professional bureaucracy" and the "adhocracy" are structures in which operating work is complex and must be carried out by highly trained professionals (Mintzberg, 1979b). However, while work in the professional bureaucracy is relatively routine and repetitive, the adhocracy is oriented toward innovation, and its professionals work in multidisciplinary teams to produce one-time outputs. The sample professional bureaucracy was a hospital (called here "St. Gabriel's Hospital"), while the sample adhocracy, (called "the CAC") was involved in a form of artistic production. The three sites chosen were medium sized (between 500 and 5000 employees) and were all under some form of public sector control.

At each site, from eight to ten current or recent strategic issues were selected for in-depth study. The issues were chosen through discussions with the CEO (chief executive officer) and through the review of the minutes of top-level management committee meetings for the past two years. An attempt was made to choose a range of different issues, while ensuring that the most important issues for the organization were included. In all, 27 issues were chosen. The topics covered a wide range, including diversification, market development, restructuring, vertical integration, closure of services, capital investments in equipment and facilities, overall productivity, and strategic planning.

The next task was to identify all incidences of "formal analysis" carried out on the 27 issues. This required some kind of operational definition of the concept of formal analysis itself. Paradoxically, given the precision and accuracy conveyed by the idea of formal analysis, such a definition is not easy to develop. While conceptual writers (e.g., Lindblom and Cohen, 1979; Mintzberg, 1979a; Pondy, 1983) freely talk about the role of "formal analysis" in the abstract as any kind of systematic approach to decision making, most empirical researchers have restricted their investigations either to a specific type of formal technique (e.g., Greenberger, Crenson, and Crissey, 1976; Frénois and Chokron, 1982) or more commonly to work done by staff specialists of a particular kind (e.g., Meltsner, 1976; Kerr, 1982; Prince, 1983; Feldman, 1983). But the concept of formal analysis means more than any specific technique, and formal analysis can surely be carried out by anybody. To understand the role and purposes of formal analysis in general, I generated an operational definition of it that was broad enough to cover most of what the conceptual writers were talking about. Although the definition adopted is not as clear and easy to apply as methods focusing on specific techniques or staff groups, it is more general and could be operationalized sufficiently to be useful. The approach used focuses on written documents reporting the results of some systematic study of a specific issue.

For every strategic issue in the sample, all documents related to this issue were collected. This set of documents formed

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These names are fictitious to protect the anonymity of the organizations participating in the research.

the raw material for identifying individual formal analysis studies and classifying them according to a number of criteria. Documents that were merely descriptive reports of events (e.g., minutes of meetings) were rapidly excluded from consideration. The remainder were examined in more detail. Gradually, a set of conventions was developed by which individual formal analysis studies could be circumscribed and identified in a fairly consistent way across the three organizations. Eventually, a total of 183 individual incidences of formal analysis were identified for the 27 issues in the three organizations. Then, as some of these studies were clearly more analytically sophisticated than others, content analysis was used to place the studies in four different categories. The criteria for classification, described in Appendix A, were quantitative content, length of report, time input required, the number of alternatives considered, and the complexity of the methodology used. The four categories were labeled, in order of increasing analytical sophistication, armchair studies, short studies, medium-sized studies, and major studies. While the armchair studies were generally rather short and unstructured, involving the development of an argument based on relatively little data, the major studies usually required considerable quantitative data, multiple research methods, and a great deal of time. The distribution of the entire sample of studies between the four categories is illustrated in Table 1. This shows that very few lower-category studies were found for Servico, while a very large number were found for the CAC. St. Gabriel's Hospital falls somewhere in between. In fact, the absolute number of studies identified at the CAC was more than double that of each of the other organizations, although the number of issues examined was of the same order of magnitude. The difference is largely made up of reports of low sophistication.

Table 1

The Number and Frequency of Studies in Each Category of Analytical Sophistication by Organization

	Servico		St. Gabriel's		CAC		Total	
Studies	*N*	%	*N*	%	*N*	%	*N*	%
Armchair	2	4.3	4	10.0	30	31.3	36	19.7
Short	4	8.5	8	20.0	27	28.1	39	21.3
Medium	15	31.9	15	37.5	15	15.6	45	24.6
Major	16	34.0	11	27.5	14	14.6	41	22.4
Unclassified*	10	21.2	2	5.0	10	10.4	22	12.0
Total	47	100.0	40	100.0	96	100.0	183	100.0

* Insufficient information

Three data sources were then used to examine the role of these formal analysis studies: documents, interviews, and direct observations. Documents were of crucial importance in identifying the individual studies, in tracing the chronological development of issues over time, and providing a fact base for later interviews with decision participants. Over 80 formal interviews were carried out with senior managers, analysts, professionals, and line managers who were in one way or another involved in the development of the issues. In addition, I was present at 26 senior management meetings across the

three organizations and was thus able to observe directly how people interacted with one another and how formal analysis might be used for some of the more current issues.

At the first stage of data analysis, I viewed the data as a large sample of 183 individual formal analysis studies, regardless of the issues to which they were related or the organizations in which they were carried out. Patterns were sought in the ways studies were used, and a typology of purposes behind formal analysis was derived. Later, comparisons were carried out to determine whether different patterns tended to be associated with different organizational contexts.

THE PURPOSES BEHIND FORMAL ANALYSIS

Interviews with people in the three organizations and conversations in meetings were the most important sources of information concerning the purposes of formal analysis. The interviews were loosely structured to allow respondents to answer in their own words. However, usually, when any individual study was under review in an interview, I asked the question, "Why was this study done?" or more pointedly, "Why do you think X initiated this study?" Other information about the purposes of formal analysis was available from documents, and this was used to complement the verbal information.

In developing a typology of purposes, a number of a priori factors (e.g., my knowledge of previous literature and my previous work experience both as a consultant and as an internal analyst in two different organizations) suggested possible categories. I was also concerned to be as exhaustive as possible, while producing a parsimonious classification with a small number of components, each suggesting a distinct reality. The main objective, however, was to reflect the data accurately. To do this, in my first passes through the material, I generated a large number of purposes, sometimes using terms taken directly from interviewees: e.g., "education," "assistance," "side-tracking," etc. These were combined together into internally consistent groups. The typology that eventually emerged consisted of four broad categories of purposes: (1) information, (2) communication, (3) direction and control, and (4) symbolic purposes. Within each of these broad categories, the original, more specific categories survive as variants. These are listed in Appendix B and are described below. Clearly, no classification is perfect, and another researcher might group purposes differently. The information and communication groups seemed self-evident in the data and correspond readily with other researchers' distinctions between instrumental and justificatory uses of analysis (e.g., Kerr, 1982; Meyer, 1984). Symbolic purposes for analysis were immediately very striking as a group during contact with the CAC, and they too have support in the literature (Meyer and Rowan, 1977; Feldman and March, 1981). The direction and control group has been less frequently distinguished by other authors. However, there were several important studies in the sample in which the main motive for analysis seemed to be to stimulate other managers to get something done by asking for a report. This seemed both distinct from other categories and important, and elements of it have been suggested by Dalton (1959) and Quinn (1980).

Various definitions and labels (e.g., "attention focusing," "action") were examined before the final choice of a label was made.

It should also be emphasized here that it was not always possible to associate a single type of motivation with each analytic study. Formal analysis has a number of obvious characteristics: it generates information, it is a vehicle for communicating ideas, it focuses attention on problems, it symbolizes rationality, and it consumes time and energy. When people choose to initiate formal analysis, they are choosing a "gestalt"—not one particular characteristic of the whole. People may have several reasons for choosing to do an analysis. In coding the data, therefore, the four categories were not viewed as mutually exclusive. In fact, in the final coding, 55 percent of studies were associated with one broad type of purpose, 39 percent were associated with two types, 5 percent were associated with three types, and 1 percent of studies were found to involve all four types of purposes.

A special "purposes" data file was created for each study. This file included the following raw data items extracted from the complete data base: (1) extracts from all interview transcripts referring to reasons for initiating the study, (2) notes taken in meetings in which the reasons for doing a given study were discussed, and (3) all references to study objectives or purposes taken from the report itself or from other relevant documents (e.g., minutes of meetings, correspondence, etc.).

On average, each file coded contained information from 2.34 interviewees and from 1.34 documents. Twenty-one studies were excluded from the analysis because the information obtained was inadequate to make an assessment of the purposes behind the study. It is difficult to assess the effect of these exclusions on the overall results. However, the absence of adequate data on a given study is often symptomatic of the low importance accorded to it by people interviewed. Purposes were then assigned to individual studies by reading carefully through the special files to determine whether each of the types of purposes described in Appendix B was relevant to that study, based on the information contained in that file. The quotations from interviews given in the next section provide examples of the types of statements that were seen as indicating the presence of different kinds of purposes. Studies were classified solely on the basis of the information in the special files: the purpose had to be specifically indicated in documents or in the interview or meeting transcripts. Thus, the results on the relative frequencies of different purposes may be biased toward those purposes that were considered most presentable or legitimate in organizational terms and against those purposes that were less easily admitted.

To improve the classification and examine its reliability, a second coder re-evaluated all the studies according to the same classification scheme. Disagreements were then discussed and resolved by requiring each coder to carefully justify his or her assessment. In their initial independent assessments, the two coders concurred about the presence or absence of the information, communication, direction and

control, and symbolic purposes for 78 percent, 85 percent, 84 percent, and 88 percent of studies, respectively. Some significance tests were carried out on comparative frequency data on the purposes behind analysis (presented below). Given the imperfect reliability of the classification, the tests were carried out using the three different codes (two coders' ratings and an agreed code). Many of the conclusions are strong enough to be insensitive to changes in the coder. A similar approach was used by Staw, McKechnie, and Puffer (1983) in their study of justifications for organizational performance in annual reports.

The four groups of purposes identified for formal analysis are described below in more detail. Quotations from interviews are used liberally to illustrate the kinds of purposes identified, and qualitative observations are used to enrich the description.[2]

Information

Formal analysis studies are often carried out to obtain information to gain a better understanding of issues. As one interviewee put it, "I have to do an analysis, have all the information . . . as much information as possible." This corresponds to the view purveyed by much of the prescriptive literature on management, which presupposes that the person who initiates the study is in a state of uncertainty. Because information seeking is seen as a very legitimate motive for formal analysis, people tend to be very willing to cite such reasons in interviews. Moreover, most analyses generate some sort of information, whether this was the main purpose or not. Information collected is often later used to justify a proposal to others (a communication motive, discussed below), and it is rarely certain, even to internal people, to what extent the same information might have been collected anyway in order to take the decision and to what extent the initiator of the analysis was merely trying to construct a convincing case. For these reasons, the frequency of information-seeking motives may be overestimated here. However, it remains clear that this was an important motive for analysis. Fifty-three percent of the studies in the sample were classified as involving this purpose, based on the data obtained.

Information seeking via analysis could occur in various ways. Sometimes, the initiator of the study was seeking new knowledge open-mindedly: "It's very simple. I've always thought that to manage was to look ahead. So we absolutely have to install a system which focuses on what we want to do next year and brings together all the information in the organization." But information seeking can also be less open-minded, as people seek to confirm a tentative opinion: "We had data which led us to come to this conclusion. And a study like that, coming from outside, could help us validate and confirm our ideas."

Further information-seeking activity, especially at top-management levels is oriented toward the verification of other information sources reactively. This seemed to be particularly necessary when issues were highly technical and understanding required specialized expertise that was not readily available to senior management: "We're prisoners of the

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Names and certain other details in the quotations have been disguised to protect anonymity, and some quotations have been translated from the original French by the author.

technicians, and they're not objective. At one point, we got the engineers involved simply to obtain an independent view."

Cases were also noted in which top managers asked for analyses, not so much to obtain hard factual information but at least partially in order to sense the feelings of a wide range of organization members, what might be called "pulse taking." In fact, at the CAC (though not in the other two organizations), the "call for papers" seemed to be an accepted way of simply finding out how organization members viewed issues: "I insisted that each and every one of that group write a paper on his own concerns. Then we'd meet for lunch and then swap the papers around and discuss what our points of view would be. . . ."

Communication

Formal analysis is also often initiated by people who have very few doubts about what should be done. They are already in a state of conviction and use analysis simply to communicate this conviction or to bring other people over to their point of view. "I prepared the report because I knew we had to justify the project," as one interviewee stated. This should come as no surprise—the phenomenon has been noted by many people (e.g., Bower, 1970; Feldman and March, 1981; Kerr, 1982; Meyer, 1984). In fact, there is a perfect duality between the information-seeking and communication motives for analysis. However, while information seekers are likely to try to maximize the number of independent sources of information they receive, we can expect that communicators would like to minimize this number—and retain control over as many of them as possible. Overall, it is estimated that 57 percent of the analyses in the sample were at least partially initiated with some kind of communication motive in mind.

Analysis used for communication takes several different forms. Often it is simply used as a means of direct persuasion by a line manager who has a project for which he or she desires approval from senior management. The manager writes up a study him- or herself or delegates a subordinate to do the work. There is often no pretense here that information was a motive for the analysis, and the communicator's own criteria for the decision may be openly quite different from that of the principal target: "We didn't really do it for the profitability but for other reasons. The study . . . that was just because we had to have economics of it for the Board. We had to have something to support the decision. . . ."

Sometimes, instead of doing the study him- or herself or delegating it to a subordinate, the initiator of a study asks an outside consultant or a staff person from a higher level to do the analytical work. Obviously, the communicator has seen that the credibility of his or her case will be enhanced if it is supported by an independent source. This manifestation of the communication motive could be called indirect persuasion: "Well . . . we were chicken—we knew that if we came with a study as important as this done internally by a couple of sparrows, our chances of getting it through would have been less. And also, we wanted to confirm that our ideas were O.K. It was half and half." This kind of communication activity overlaps with information-seeking motives, especially at the level of self-confirmation.

In other cases, the most important communication targets for formal analysis may not be at the top, but among subordinates or colleagues. In fact, although top managers often have on paper all the formal authority necessary to impose their wills, they are aware that things will go more smoothly if everyone is convinced that the directions chosen are the right ones, or at least that they are inevitable. Several interviewees used the word "education" to describe this phenomenon. I identified two approaches to the use of formal analysis for the education of subordinates and colleagues. Sometimes, information was generated (i.e., statistics illustrating the phenomena in question) and a direct appeal was made to the "pupil's" intelligence: "We're doing studies on this. That should help to convince certain people." In the second approach, emphasis is placed on participation in the decision-making process and developing commitment to decisions reached "collectively." "Education" in this mode may appear somewhat manipulative:

> We said, "O.K.—nothing is decided yet—we'll set up a task force to look at alternatives." And we did put forward some ideas. . . . Naturally, we favoured option A. But if we suggested that, they would have all sorts of arguments—we had to get them to bring it up themselves. So we came in and said we wanted option B . . . those were our "alternatives." . . . And so gradually through the discussion, they came round to saying O.K. to option A.

In another variant of the communication motive, sometimes people use analysis to communicate their points of view ("positioning"), even though they know there is little chance of influencing the organization's decisions in any immediate way. This is the communication counterpart of "pulse taking." This kind of motive was very common at the CAC and seems to account for a large proportion of the "armchair analyses" found in this organization. People seemed to feel a great need to tell others where they stood, or did not stand: ". . . there has been no attempt to consult with us about this. This is a vacuum I'm working to fill. I'm writing a paper on it. . . ."

Direction and Control

One interviewee explained, "They have to meet their objectives. . . . When they didn't do that, well, they had other people looking over their shoulder, and they didn't like it. . . ." In this research, cases were encountered in which managers initiated formal analysis not so much because they needed information, nor because they needed to convince anyone of anything, but because they wanted a specific problem solved or a particular decision detailed and implemented. Analysis was used for direction and control to focus subordinates' attention on issues and to ensure that actions were taken. It is estimated that 25 percent of the sample involved this kind of motivation, which obviously overlaps with information seeking and may also occur in different ways.

Line managers have responsibility over certain areas and often solve problems and initiate changes themselves. However, sometimes problems are first identified or major changes are initiated from above. In this case, senior management often delegated work to line managers by initiating a formal study and reporting process (direct delegation):

"There are programs and activities which must be specified to reach the ultimate objective. Human and financial resources are required. Even if these have been identified in a macro way before, I think decision-making must be delegated." The details of major decisions had to be worked out so that they could be implemented and action could be taken. Requesting a formal analysis report describing in detail what was to be done was a way of ensuring that the line was responding adequately.

But what happens when direct delegation fails to produce the desired results—when line management lacks the skills or the inclination to ensure that the desired action is taken or that the given problem is solved? One answer to this is to send someone to "help" them—usually a staff person—in another manifestation of the direction and control motive for analysis: "It wasn't a question of spying or anything like that—it was mainly to help them. If they couldn't do it themselves, they were helped."

Symbolic Purposes for Analysis

Several writers (e.g., Edelman, 1985; Meyer and Rowan, 1977; Feldman and March, 1981) have suggested that societal norms of rationality encourage organizations to adopt formal analysis procedures in order to legitimize their activities and enhance their survival prospects, even though these procedures may not serve any immediate instrumental purpose. More specifically, because it is often used to obtain information, to rationally justify positions, and to prepare for action, formal analysis has come to symbolize information use, rational decision making, and willingness to act. And when many people are involved in a study process, analysis may also symbolize participation and concern with other people's views. However, the fact that formal analysis is carried out does not ensure that information will be used, that rational arguments can influence the decision, that action will be taken, or that anyone's opinion will be listened to. Analysis may therefore also be used to convey a message that is purely symbolic—to impress others within or outside the organization or to hide another less laudable motive. The following quotations illustrate various facets of the symbolic uses of analysis:

Symbolizing rational decision making: The project would have gone ahead anyway. If we had wanted to use the analysis to say "No"—we could have done some more work, but it would have gone ahead anyway. It was a question of principle . . . you have something which goes through with no authorization or discussion—that scared me. That must not happen because tomorrow, it'll be something else. . . .

Symbolizing action: Well, it was a way of making a decision to go ahead without making a decision to go ahead. So it was possible to say "We're moving to a new phase. . . ."

Symbolizing participation and concern: . . . I think it was part of his campaign strategy to get support for his candidacy as CEO . . . but that's a cynical view. I'd also like to believe he was looking for ideas and genuine input.

Certain authors (e.g., Beyer and Trice, 1982; Meyer, 1984) have tended to use the term "symbolic" in a broader way than I have done in this study by including all noninformational uses of formal analysis in the symbolic category (in particular,

those I have described under "communication"). However, when analysis is used for persuasion, the implicit message, "Here is what I want and here is why you should approve it," is not inherently "symbolic." It becomes so only if it is transmitted to a target who really has very little power to decide on the issue. The analysis may then allow the target to believe that he or she participated in the decision and/or took the decision rationally. Such cases did occur in the sample, and there is therefore some overlap between communication and symbolic purposes, but all uses of analysis for communication are not necessarily symbolic.

As several writers have suggested, symbols serve a very useful function in organizations, and skilled managers are masters of them (Meyer and Rowan, 1977; Peters, 1978; Pfeffer, 1981). But the symbolic studies identified in my research sometimes left people rather angry: "I'd much rather someone would say to me, 'Look, Dick, old boy—this is it. . . . Don't give me that crap'." In fact, when symbolic uses of analysis were mentioned by interviewees in general, it was often either in a derogatory way (notably by targets of the symbolic message) or with a hint of conspiratorial complicity with the interviewer (by participants in the creation of the symbol): they were viewed as slightly underhand. All this may seem paradoxical, given that symbols are intended to enhance legitimacy. The explanation lies in the fact that a symbol loses most of its value as soon as people suspect that it is a symbol—and not the real thing (see also Pfeffer, 1981). It is conceivable that the studies identified explicitly as having symbolic purposes in my sample may be biased toward the less successful symbolic uses of analysis—less successful because their nature has been revealed explicitly (to the respondent, to the researcher, and therefore probably to others). Other studies, whose role is also symbolic, may not have been identified as such by participants because they have succeeded so well in their symbolic function that this may be hidden, perhaps even from those who participated intimately in their development. As suggested by Pfeffer (1981: 47), "management and politicians fool themselves as well as others with their symbolic acts." Moreover, if the illusion is preserved, such studies are also more likely to begin to serve substantive functions as well as symbolic ones. As Feldman and March (1981: 181) suggested, the dynamics of symbols are such that symbolic uses of information can be gradually transformed into instrumental ones as "individuals who request information are likely occasionally to find it useful, even to come to believe in the general utility of information gathering." The best symbol is of course the real thing, which makes empirical identification of symbolic uses of formal analysis rather difficult. Because such purposes are less easily recognized and admitted, they are also less easy to detect. Thus, although only 19 percent of studies were associated with this purpose through the classification process, this may be an underestimate. I believe that the results obtained here are nonetheless revealing. They demonstrate the existence of symbolic motives and provide indications of their perceived prevalence in each of the three organizations.

One other characteristic of formal analysis is that it consumes time and energy. Normally, one would view this as the cost of

doing analysis. However, it can sometimes become an end in itself: analysis is used for procrastination. Formal analysis may postpone the moment of truth when a decision must be taken or may divert attention until problems resolve themselves. At Servico and at St. Gabriel's, this type of motivation was mentioned only rarely. But Brewer (1981) placed great emphasis on it in his evaluation of the role of analysis in government, and at the CAC, this motivation was suggested by several interviewees: "All I wanted was to be able to gain time. . . ." Other formal analysis studies would probably never have taken place but for the serendipitous occurrence, more or less unrelated to the issue at hand, that someone was available with a particular kind of expertise waiting to be used:

> Then I bumped into Ivor by accident—I know him well because we used to work together. I said, "What are you up to these days?" And he said, "Nothing much—I've left my old job and I'm looking for something else. . . ." So we had a drink together and I said, "I have this problem . . ." and I gave him a small contract.

Not all human activity is purposeful—not even the initiation of a formal analytic study in a fairly large organization. Organizations of this size have analysts permanently on staff, and these people must keep themselves (or be kept) occupied in order to justify their existence. Because the use of analysis for procrastination or to keep analysts occupied is not generally perceived as legitimate, the symbolic aspects of formal analysis noted above are crucial to disguise such behavior, so these motives are grouped together in the same broad category.

THE PURPOSES FOR ANALYSIS AND ITS SOCIAL INTERACTIVE CONTEXT

The use of formal analysis has often been associated with the classical rational actor model of decision making and thus viewed as somewhat incompatible with political and social interactive processes. But from the above discussion, it should be clear that far from being incompatible, formal analysis and social interaction are closely related. Formal analysis would be less necessary if everybody could execute their decisions themselves, and nobody had to convince anybody of anything. In fact, one could hypothesize that the more decision-making power is shared between people who do not quite trust one another, the more formal analysis tends to become important. Formal analysis is often done to obtain information, but people also use it for communication, direction and control, and for its symbolic value in conveying messages of rationality, concern, and willingness to act. Even when they use formal analysis for information purposes, they may be checking up on other information provided by other people—because they do not quite trust it. To understand the role of formal analysis in organizations, it is necessary to understand how it is related to its social interactive context.

In the remainder of this paper, the relationship between the use of formal analysis and its social interactive context is explored, and six interaction patterns are identified. I examine how the nature of the hierarchical relationships between the participants in the analysis process may help to predict how it is used. The frequencies of different purposes for analysis in the three organizations are then compared and these re-

sults are related to the nature of the organizational structures involved.

Interaction Patterns

To characterize the social interactive contexts surrounding the individual formal analysis studies inventoried, I identified, for each incidence of analysis, the "initiator" of the study (the person who first requested or suggested it), the "executor" of the study (the individual or group responsible for carrying it out), and the main "targets" (the individuals or groups to whom the study was principally addressed). By examining the hierarchical links between these three participants in the process, most incidences of analysis could be mapped onto one or more of six interaction patterns, built around the elemental interaction triad shown in Figure 1. This consists of a mini-organization chart connecting three types of people: a manager (M), a line person reporting to M (L), and a staff person (S). This staff person may be an internal analyst, reporting hierarchically to M, or an independent consultant. When the initiator, executor, and targets of any incidence of analysis are identified and linked on this skeleton organization chart, the interaction pattern for the analysis is obtained. Each interaction pattern is summarized by three letters identifying sequentially the relative hierarchical positions of the initiator, the executor and the main target(s) of the study. For example, interaction pattern "L-L-M" indicates that a study is initiated by line management (L), executed by line management (L), and sent up the hierarchy to top management (the target—M). By combining the three roles (initiator, executor, and target) with the three points in the triad, one could theoretically obtain $3 \times 3 \times 3 = 27$ possible combinations. However, many of these are either unlikely or seem to be minor variants of others. In order to create a meaningful but relatively parsimonious classification, a certain number of conventions for identifying line and staff people, for telescoping the hierarchy, and for combining targets were developed. This resulted in the six main interaction patterns described below and illustrated in Figure 2. Ninety-five percent of the studies for which sufficient information was available could be classified in this way, although some studies were placed in more than one category (see Appendix C).

The frequencies of each of the major categories of purposes for each interaction pattern are presented in Figure 3. As indicated, several key differences between the patterns are statistically significant, both for the agreed purposes and for

Figure 1: The elemental interaction triad.

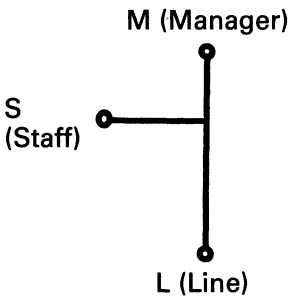
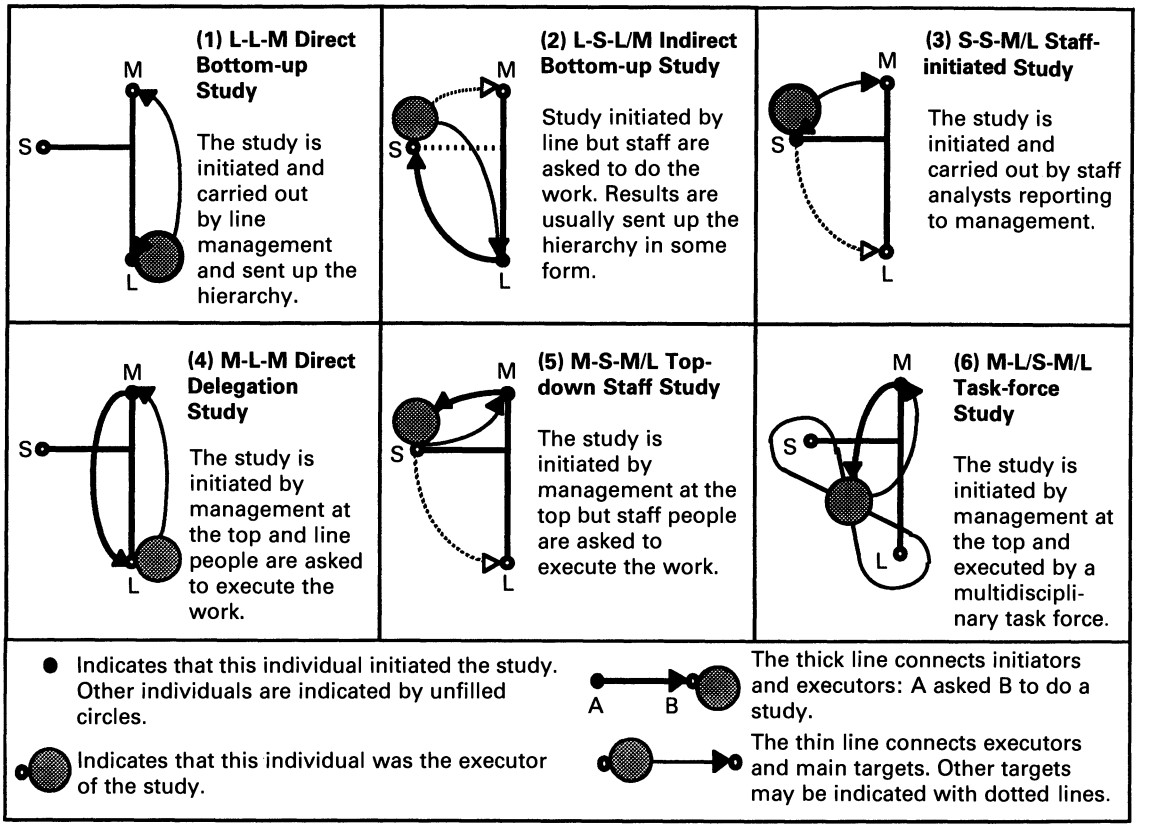


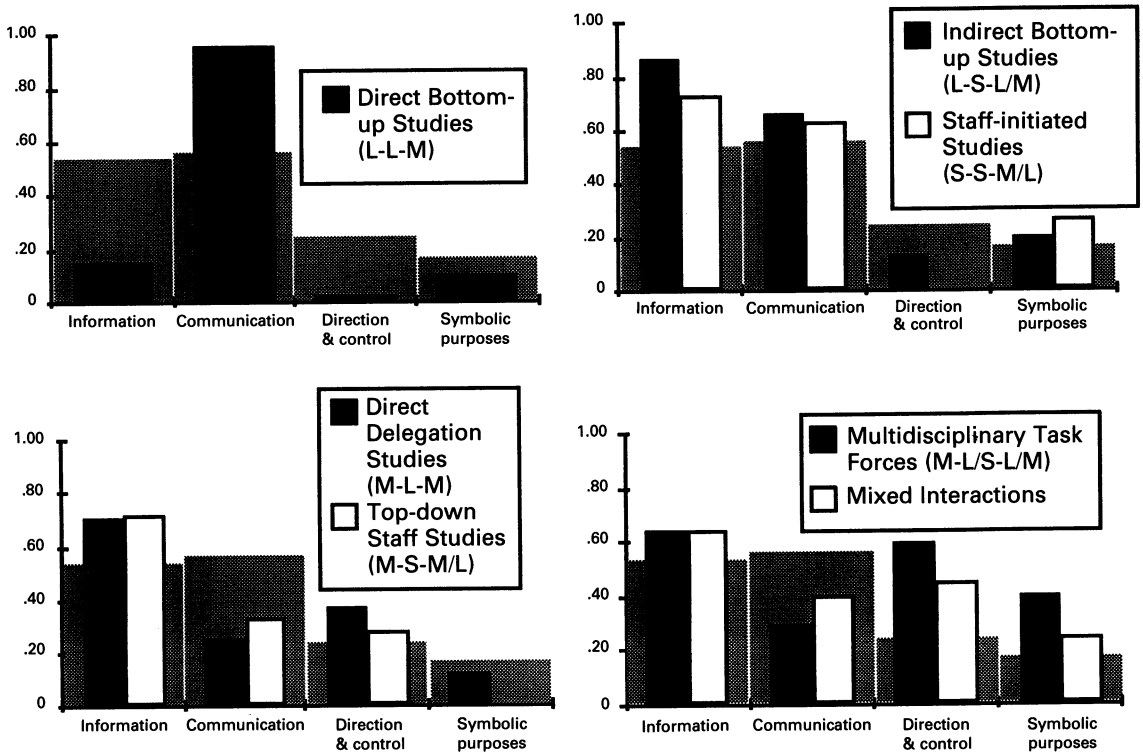
Figure 2: The six interaction patterns.



those suggested by the two coders separately. Moreover, the same key differences tend to emerge when the three organizations are considered separately, even though these organizations were structurally very different. The data used to construct the figures and to carry out the tests are presented in Appendix D. I now summarize briefly the implications of each of the six interaction patterns as suggested by the research results, using qualitative descriptions of the types of behavior observed, supported by quotations from interviews to build on the quantitative comparisons in Figure 3.

It was suggested earlier that when an individual chooses to initiate a formal analytic study, he or she is choosing a "gestalt" that has a variety of different properties. The data presented here suggest that different interaction patterns may correspond to different gestalts, grouping together somewhat different sets of purposes. Moreover, each pattern seems to have its own political dynamics related to the different hierarchical positions of participants, their diverging motivations, and their different knowledge bases. In the discussion of each pattern, I put forward propositions concerning the purposes behind this type of study. These propositions are supported by the data presented in Figure 3, although because of small sample sizes, I have limited statistical tests to grouped data. I also provide some examples of the kinds of political issues raised by each of the patterns, based on qualitative evidence obtained from interviews.

Figure 3: Frequencies of different purposes for formal analysis by interaction pattern.



The shaded background area shows the frequency of the four types of purposes across the entire sample.

Statistically Significant Differences between Interaction Patterns, Controlling for Organization

Interaction patterns are often grouped together in this analysis to create sample sizes large enough for statistical tests, e.g., direct bottom-up (L-L-M), indirect bottom-up (L-S-L/M), and staff-initiated (S-S-L/M) interaction patterns are all "bottom-up." Direct delegation (M-L-M), top-down staff studies (M-S-M/L), and multidisciplinary task forces (M-L/S-M/L) are all "top-down." Mixed patterns are both bottom-up and top-down. The total number of cases associated with each interaction pattern is 47, 15, 11, 24, 18, 20, and 20, respectively (see Appendix D).

1. Information motives are less frequent with direct bottom-up studies (L-L-M) than with the other pure interaction patterns. Differences in proportions significant ($p < .01$) for overall sample (Coder 1, Coder 2, and agreed codes). Differences significant ($p < .01$) both for St. Gabriel's and the CAC taken separately using chi-squared test (sample sizes too small for test of differences in proportions). Differences in the same direction for Servico, but not significant. The Cochran-Mantel-Haenszel general association statistic controlling for organization is significant ($p < .01$).

2. Communication motives are more frequent for bottom-up interaction patterns (i.e., direct bottom-up studies, indirect bottom-up studies, staff-initiated studies, and mixed studies) than for other interaction patterns. Differences in proportions significant for overall sample ($p < .01$) (Coder 1, Coder 2, and agreed codes). Differences significant ($p < .05$) for St. Gabriel's and for the CAC ($p < .01$) using chi-squared test. Differences significant ($p < .05$) for Servico using Fisher test (expected cell frequencies too small for chi-squared test). The Cochran-Mantel-Haenszel general association statistic controlling for organization is significant ($p < .01$).

3. Direction and control motives are more frequent for top-down interaction patterns (direct delegation, top-down staff studies, multidisciplinary task forces and mixed studies) than for other interaction patterns. Differences significant ($p < .01$) for overall sample using chi-squared test (Coder 1, Coder 2, and agreed codes). Differences significant ($p < .01$) for the CAC using chi-squared test. Differences significant for Servico ($p < .01$) and St. Gabriel's ($p < .05$) using Fisher test. The Cochran-Mantel-Haenszel general association statistic controlling for organization is significant ($p < .01$).

4. Multiple types of motives are more frequent for interaction patterns involving more actors (multidisciplinary task forces and mixed patterns) than for others. Differences in proportions significant ($p < .01$) for overall sample (Coder 1, Coder 2, and agreed codes). Differences significant for the CAC ($p < .01$) using chi-squared test. Differences in the same direction for Servico and St. Gabriel's, but not significant ($p > .10$).

Pattern L-L-M: The direct bottom-up study. This interaction pattern applies to studies in which the initiation and execution of a study is under the hierarchical control of a single line area (L), while the main target is at a higher hierarchical level (M). The content of the report sent up the hierarchy is thus fully controlled by line-area management. People with independent access to top management have had no input, and the initiative lies not with top management but with the line area itself. This interaction pattern was often present in combination with others. For example, a senior manager might ask a staff subordinate to study an issue within the domain of a line subordinate (M-S-M/L, the top-down staff study). This report, or some version of it, is then sent by this senior manager to his or her hierarchical superior (i.e., pattern L-L-M, the direct bottom-up study). Only "pure" L-L-M studies (about 30 percent of the sample) are identified as direct bottom-up studies in the graphs in Figure 3. Those involving more than one set of interactions are classified as "mixed."

As illustrated in Figure 3, direct bottom-up studies are firmly and consistently associated with communication purposes. This interaction pattern was associated with attempts to obtain approval for desired projects in all three organizations (direct persuasion) and with less focused "positioning" by professionals and managers, especially at the CAC. Pure bottom-up studies were also on average less analytically sophisticated than studies using other interaction patterns. The differences were significant ($p < .01$) and consistent across the three organizations. Because their authors have a clear message they want to communicate, these studies tend to compare fewer alternatives and are clearer about the actions recommended than others. Moreover, because they are often carried out by line people, rather than staff analysts, simpler methodologies are used.

Given that the people who initiate and execute bottom-up studies are usually already in a state of conviction about an issue, and often have a personal interest in championing it, one would expect this kind of study to be received with a good deal of skepticism by its targets. In fact, bottom-up studies done by professionals (doctors at St. Gabriel's and especially artists at the CAC) were particularly likely to be ignored, as many were done for positioning purposes—there was little expectation that influence would be very high. It was also clear that for some professionals, perhaps more than for other managers, formal analysis was often only one relatively minor element in their strategy for getting what they wanted: "I prepared the report because I knew we had to justify the project. But on its own, it wouldn't have worked. I had to take other steps. . . ."

"Mixed" studies involving both bottom-up and top-down patterns are much less clearly associated with communication (see Figure 3) and tend to be more analytically sophisticated than pure bottom-up studies (differences were significant at $p < .01$ over the whole sample). In these cases, the bottom-up process was preceded by a top-down phase in which initiators of studies used analysis for information or for direction and control. It was noticeable, however, that when such studies were sent up the hierarchy in the bottom-up mode, uncertainty tended to be absorbed along the way (as sug-

gested by March and Simon, 1958): the number of alternatives was reduced, and a more decisive tone was taken in the report. Reasons for adopting the course of action proposed were multiplied, and those for adopting alternative courses of action were suppressed.

Pattern L-S-L/M: The indirect bottom-up study. Here, the study is initiated by the line but executed by staff people who are not under the direct hierarchical control of the initiator. The study may be used locally, but it is also sent up the hierarchy in some form. The staff people used may be hierarchically responsible to top management, or they may be outside consultants, as in fact occurred with most of the cases encountered.[3] Here, the line controls the mandate of the study but has less control over its content than with the direct bottom-up study. This assumes that external consultants are usually more independent of study sponsors than internal analysts under the hierarchical authority of the line (L) may be. This assumption may not always be true but was clearly shared by people interviewed: "Well, coming from the outside and not being under the CEO . . . I had greater liberty of expression than other team members." Ten percent of the sample of studies used this pure pattern.

Indirect bottom-up studies are clearly associated with both information and communication purposes, as shown in Figure 3. Outside analysts are used to obtain access to expertise unavailable internally (information) but also to make the conclusions more credible to targets at higher levels (communication): "We didn't know. And when we don't know, we get someone from outside . . . and at the same time, that gives Board members confidence." For several instances of the interaction pattern, the initiator was in fact clearly looking for support for a preconceived idea. People in this position are torn between two more or less incompatible objectives: to control the content of the information sent to their superiors and to maximize the credibility of this information by making it appear to come from an independent and objective source. If line managers really do control the information contained in these studies, then it will be difficult to make them appear independent: "I didn't even read that report—I just filed it, because it was simply a commission—the consultants just wrote what he told them to write." And if the source is really independent, then control over the information is at least partially lost and there is a risk that the analysts will fail to come to the desired conclusions. A trade-off has to be made between the risk that the analyst will not confirm one's ideas and the potential return if he or she does. With pattern L-L-M (the direct bottom-up study), the risk is zero, but the potential return may also be low. With L-S-L/M (the indirect bottom-up study), the risk is higher and so is the potential return—with the level of risk and potential return increasing as the analyst moves further away from the initiator in terms of perceived independence and credibility with the management target.

Indirect bottom-up studies were typically more analytically sophisticated than those using other interaction patterns (significant at $p < .01$). However, several studies were also rather unclear about their recommendations. One reason for this is that there were sometimes discrepancies between the analysts' personal conclusions, based on their own expertise,

3

Because of this, a dotted line rather than a full line is used to connect "S" to the hierarchy in the diagram representing this interaction pattern in Figure 2.

and what the sponsoring client wanted the study to demonstrate. Typically, these studies went through many discussion drafts as sponsors objected to certain conclusions and tried to persuade analysts to modify their report. The result was usually a compromise: a report that made few precise recommendations and left much of the interpretation of the data to the reader: "So a firm of consultants was called in to do this study which . . . they didn't really recommend anything. . . . And the report was tabled, and it was a very iffy sort of a situation really. . . ." Deliberate vagueness to disguise differences of opinion occurred in at least three cases, all of them major studies, of three different issues. In his research on the use of operations research in the British Ministry of Defense, Kerr (1982) identified the same phenomenon.

Pattern S-S-M/L: The staff-initiated study. In this pattern, staff people (i.e., those with no formal authority concerning the issue) initiate and carry out the study, which may be sent to line colleagues and to management superiors. Staff control the definition of the problem, the work carried out, and the destination of the report. The initiating staff person may do the study him- or herself, delegate a subordinate, or hire an outside consultant. The sample size is small here (11 cases), so the conclusions are tentative.

Staff-initiated studies are particularly associated with information and communication purposes. They may also be done by analysts to symbolize activity and usefulness. Staff analysts view their jobs as suppliers of information, and this is reflected in the motivation profile in Figure 3. But some analysts also became personally very committed to certain specific ideas. Their analysis activity became oriented toward exploring and advocating these ideas. Also, when analysts initiate studies, it may be partly because they have time and skills available that they must use to justify their existence. This explains the higher than average frequency of symbolic purposes for this configuration in Figure 3.

Consistent with the conclusions of other researchers (Alter, 1978; Wedley and Ferrie, 1978), few staff-initiated studies in the sample ultimately led to the implementation of what was recommended. In fact, this interaction pattern was used for some of the most spectacularly unsuccessful incidences of formal analysis observed. The pattern seems to go something like in this analyst's account:

> Well, so we initiated the process—and it was a pretty complex process I must admit, which quickly caused reticence amongst managers . . . because we entered a bit into their areas of activity. We questioned established ways. And they were ill at ease with that. And this resulted in all kinds of normal reactions . . . well, you get us to work on this but these deadlines are impossible . . . we don't have the time, etc., etc. . . . So there was some insecurity about the whole thing. . . . and the last point, which was the main point really because if we'd had it on our side we would have completed the process, it was the lack of the CEO's support. He said "Yes"—but when it was time to say, "Yes, and that's how it's going to be," he didn't say it. And from that moment on, nothing worked.

Of course, line-staff tensions occur in almost any analysis activity in which staff are involved in studies that overlap line responsibilities. However, the consequences are perhaps more strongly felt with staff-initiated studies, because, while

the analyst usually has senior management's consent for the initiative, the senior manager concerned may not necessarily have internalized the analyst's driving motivations for the study. In the face of line resistance, his or her support may crumble rather easily. The analysts involved in the most dramatic staff-initiated disasters were clearly "intrapreneurs." They mobilized considerable resources and energy in the face of skepticism, opposition, and even (so I'm told) sabotage. However, they needed executive power to make changes of the order they envisaged. In the two most important cases (one at Servico and one at the CAC), full top-management support of the analyst and the success of the analysis effort would have implied initiating drastic action, including major structural changes that might have involved firings and demotions. The senior managers concerned clearly felt railroaded. Through their activities, entrepreneurial analysts tended to invade the territory not only of line people at lower levels, but also that of their management superiors. Staff-initiated studies seem to be risky. In my study, the risk never paid off—although based on a sample of 11, I can by no means claim that it never will.

Pattern M-L-M: The direct delegation study. Here, the study is initiated by a manager, and the work is delegated to a line subordinate. The manager at the top controls the definition of the mandate, while the line fully controls the response to it. Independent staff people are not involved, although the line may use subordinates to help respond to the request. About 19 percent of the sample used this pure interaction pattern, sometimes in combination with a bottom-up pattern.

As shown in Figure 3, direct delegation studies are associated with information and direction and control purposes. They represent the use of "normal" formal organizational channels for carrying out analysis. This pattern expresses top-management confidence in the line's expertise and ability to implement decisions: "The analyses were done by the different functional areas. . . . we said to ourselves, 'We have to have confidence in each other—we receive the studies and they are accepted'." For these reasons, this pattern tends to be rather uncontroversial. It leaves full control of the content of the study to the line manager. However, if senior management is not satisfied with the information provided or with the actions taken, the situation could become more threatening. Persistent failure to satisfy management requirements would result in mandates being given to outside people—creating a much more tense situation: pattern M-S-M/L, the top-down staff study.

Pattern M-S-M/L: The top-down staff study. Here, management initiates a study and asks staff people to carry it out. Management therefore controls the mandate of the study, the staff control the content, and line people have virtually no control at all. This was a fairly common pattern, representing about 18 percent of the sample, sometimes in combination with other patterns.

As with direct delegation, two types of purposes tend to occur more frequently than average for top-down staff studies: the need for information from an expert source or

the need for some kind of control with respect to line management (see Figure 3). Staff people were sometimes asked to provide expert opinions, information, or suggestions to managers that involved no contact with or intrusion into the domain of line people lower in the hierarchy. Sometimes, however, the motivation had definite control elements. Staff analysts could be used because senior management had been unable to obtain what it required by direct delegation to line management, and sometimes, they were used to check out information provided by the line (reactive verification).

Certain staff analysts seemed to be particularly valued for their creativity and ability to challenge established ways of doing things, in spite of the fact that some or all of the time, their ideas were too "way out" to be given serious consideration or too theoretical to be applied directly: "His ideas can be a bit shocking—but they force you to think." This idea of the top-down staff study as a "challenge" appears particularly strongly when analysis was used for "assistance"—to stimulate action and problem solving on the part of the line (a direction and control motive). As one analyst put it: "I would say that 90 percent of consultant studies are not implemented. It has to be this way. If I was a manager, I wouldn't implement them either. The manager has to use his own judgment—he has to live with the thing—analyses only serve as a challenge."

Sometimes this type of study could present a particularly strong "challenge" to line managers. In at least one case, the line person involved was demoted as an indirect result of the study. Usually though, the line manager's job was not so seriously threatened and, in fact, staff people faced a difficult dilemma in handling the situation. To obtain the information they needed, they had to maintain good relations with the line, but they were often there to make recommendations that might reflect badly on the individuals concerned. Failure to maintain good relations would mean difficulty in obtaining information and a report that had little credibility. Excessive concern with good relations could, however, defeat the purpose of the exercise—to take an objective look at the situation.

The difficulties of maintaining objectivity also arose when top-down staff studies were used for "reactive verification," e.g., to evaluate a project proposed by somebody else. Sometimes, the line people proposing the projects were in fact more expert in the area than the analyst: "When the administration realized the problem, they asked me to take a look at it. But it is difficult to get the credibility. I wasn't really an expert—I had just arrived. What was missing was a really objective analysis." Moreover, over the long term, analysts would develop personal relationships with certain line managers, which made independent evaluation very difficult. In one of the three organizations, analysts were deliberately rotated round the organization in a conscious attempt to overcome the staff's tendency to develop loyalties that compromised their independence.

Pattern M-L/S-M/L: The multidisciplinary task-force study. Studies in this category are initiated by managers and carried out by multidisciplinary task forces or ad hoc working groups.

These task forces may include both line and staff people, or they may include line people from different functional areas (and no people in staff positions). The manager controls the definition of the mandate, and control over execution is shared by many people, with no one having absolute authority over the others. Seventeen percent of the sample used this pattern, sometimes in combination with a bottom-up pattern.

A combination of information, communication, direction and control, and symbolic purposes tends to lie behind multidisciplinary task-force studies, as illustrated in Figure 3. Task forces are ideal mechanisms for obtaining input and information from a wide variety of people concerning issues (an information purpose). They are also seen as an ideal mechanism for developing involvement and therefore commitment to proposals. Some task forces seemed more oriented toward top-down "education" of line managers and/or professionals (a communication purpose), rather than being pure study and decision mechanisms. Other task forces, notably at the CAC, where management was undergoing a crisis, seemed to be set up to gain time and give people the impression that they were participating in decisions (a symbolic purpose). Finally, others were established so that coordination could take place between various functional areas over the implementation of certain well-defined projects (a direction and control purpose). Often several purposes were involved simultaneously. As indicated in Figure 3, significantly more types of purposes per study were associated with this pattern than with others. The wide participation of organization members allows scope for many different motives and for many different political phenomena to occur.

In consonance with this, almost all task forces were the scene of interpersonal tensions of some kind. This was particularly true when there was ambiguity over the leadership and mandate of the study. Ambiguity over leadership was very common. Task forces were often set up with nominal "coordinators," but without formal hierarchical authority, power usually flowed toward the person with the greatest expertise, energy, and interest in the issue under study. There was a clear difference between the nominal and real leaders of task forces in at least six cases in the sample: "The problem was that the project leader didn't know anything either. So she was dependent on Bill and hating it." Another interviewee commented: "I was the one who wrote the report. He took the position of mediator mainly."

In fact, because of this ambiguity over leadership, task forces often provide a secondary battleground for career rivalries, even if people are not too far apart on substantive issues: "Everyone on the task force was hoping that he would be the one to take over this new unit." This kind of ambiguity and rivalry over leadership could be constructive if it encouraged people to be creative and gave them an opportunity to demonstrate their skills and leadership potential. However, when ambiguity over leadership was combined with ambiguity over the mandate for the study and conflict over substantive issues, the results could be disastrous. This occurred for one issue at the CAC. Management apparently felt that if everyone was put into the same room together they could come up with a consensus and that consensus would decide

what should be done. In fact, the opposite occurred: "There were about 200 different viewpoints but there was no institutional viewpoint. We spent days and days arguing about various options . . . all sorts of technical details . . . but nobody stated what kind of thing we were really trying to do." Coordinated action across functional areas seems to require clarity of purpose on the part of senior managers who ultimately have to act as referees whether they participate directly or not. The wide literature on small groups (Collins and Guetzkow, 1964; Cartwright and Zander, 1968; Brandstätter, Davis, and Stocker-Kreichgauer, 1982) tends to support these conclusions.

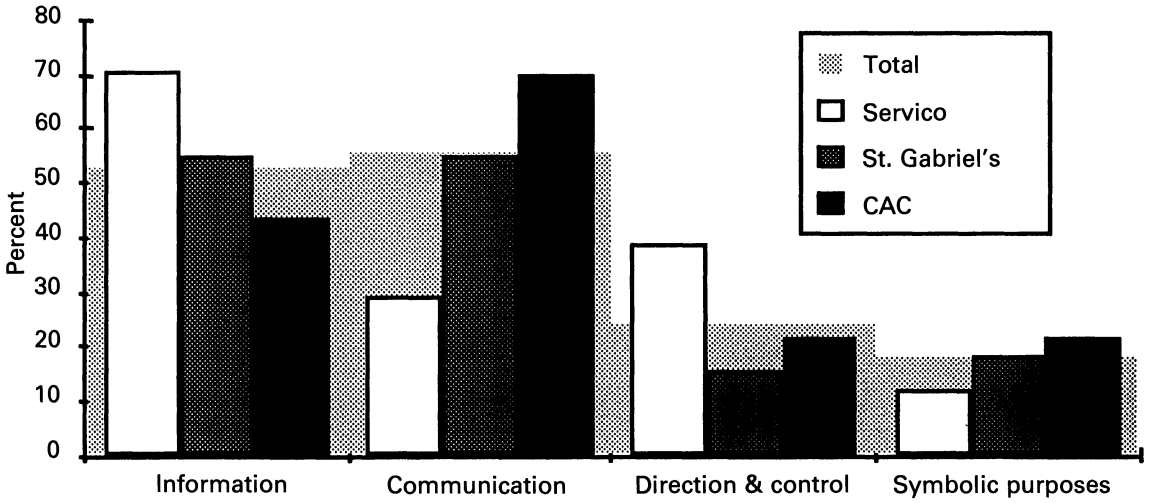
COMPARISON OF THE THREE ORGANIZATIONS

The relationship between the purposes behind analysis and its social context is now examined at a more macro level by comparing the three organizations. Given that these organizations had different structural configurations (Mintzberg, 1979b), one would expect the overall social interactive context also to be different in the three organizations, generating different patterns of purposes. This expectation is confirmed, as shown in Figure 4. Although not all the differences observed are statistically significant, the CAC apparently used analysis less for information and more for communication and symbolic purposes than the other two organizations. Servico is the most information oriented, the most control oriented, and the least communication oriented, while St. Gabriel's Hospital generally falls in the middle but is the least control oriented of the three.

With a sample of only three organizations, it is impossible to draw firm conclusions about the causes for these differences. However, they do not seem inconsistent with the nature of the organizational structures represented, and it is therefore hypothesized that the patterns in the purposes behind formal analysis may vary depending on the organization's structural configuration. For example, the relative importance of information and direction and control purposes at Servico seems consistent with the machine bureaucratic nature of this organization—a structure in which decision-making power is concentrated at the top and where the technostructure is very important. In fact, the CEO here was well-known for defining in very clear terms exactly what was required in analyses. This insistence on detail at the top was transmitted down the hierarchy, because people knew that their proposals would have to be well documented: "You really had to be on your toes when you presented something at management meetings . . . he always had the right questions." If people did not produce information satisfactory to the CEO, they would be sent back to the drawing board until they did. Repeated failure to respond as required might ultimately affect a manager's career path within the organization: the direction and control orientation of analysis was very evident here.

At St. Gabriel's Hospital, the CEO was also an avid consumer of information and seemed very concerned that decisions should be taken rationally. However, although this organization could function in a similar way to Servico for administrative-type issues, it was not possible to operate this way for some of the most crucial issues in which medical staff were

Figure 4. Frequencies of different types of purposes by organization (% of studies associated with each type of purpose based on agreed classifications).



Statistically Significant Differences in Proportions (One-Tailed Tests)*

	Servico vs. St. Gabriel's			St. Gabriel's vs. CAC			Servico vs. CAC		
Purpose	C1	C2	A	C1	C2	A	C1	C2	A
Information	NS	•	•	••	•••	NS	••	•••	•••
Communication	•••	•••	•••	NS	NS	•	•••	•••	•••
Direction & control	••	••	••	NS	NS	NS	••	NS	••
Symbolic purposes	Values too small			Values too small			Values too small		

• $p < .01$; •• $p < .05$; ••• $p < .01$

* C1 = coder 1, C2 = coder 2, and A = agreed score. $N = 41$ for Servico, $N = 38$ for St. Gabriel's, and $N = 83$ for the CAC.

involved. Some of these issues were necessarily initiated by the medical staff members themselves, making bottom-up communication an important purpose for analysis. However, even when initiatives came from the CEO, it was not easy to use analysis in a direction and control mode as at Servico. Most physicians were not even on the payroll and could not be forced to comply with management requests. But although doctors could not be directed, they might be "educated" through involvement in decisions and exposure to relevant information. This contributes to explaining the relative infrequency of direction and control purposes and the relative importance of communication purposes here. This phenomenon is directly related to the professional bureaucratic nature of the organization, accentuated by the modes of remuneration used for medical staff.

The results from the CAC also seem consistent with its organizational structure as an adhocracy, but they are probably also influenced by the fact that this organization was undergoing a major crisis around the time of the research. I have already noted the large number of minor analyses generated

here as people volunteered their views on major issues. This generates a high frequency of the communication motive in this organization. This exchange of opinions in writing was partly stimulated by professionals' anxiety concerning the organization's future. But although the organization's problems were certainly an important causal factor, such behavior also seems more likely to occur in an organizational structure like the adhocracy, which involves wide participation in issues and relatively weak authority relationships (Mintzberg, 1979b). Figure 4 also suggests more uses of formal analysis for symbolic purposes at the CAC than at the other two sites. In fact, as many more studies were done overall at the CAC, the relative frequency data in Figure 4 translate into about three times as many studies per issue done for symbolic purposes at the CAC than at the other sites. This was accompanied by a pervasive and overwhelming cynicism about its role. The following comments from people in three different jobs illustrate this:

Top manager: Studies—for me, they're nothing but a sidetrack. . . .

Professional: It's not necessary to write so much if you want to decide. If the objective is to avoid deciding, well studies are good for that.

Top corporate analyst: Most of the studies I have been involved in were not used to make decisions. Studies are used to support political decisions already taken.

Perhaps symbols may be more necessary in a structure in which many people are involved in decisions. However, given that my methodology may more easily identify the less successful incidences of symbolic analysis, another contributing factor may be the breakdown in organizational legitimacy that accompanied the crisis noted above.

A final question concerns the degree to which the interaction patterns explored in the previous section can explain all the differences observed between the three organizations. The question is To what extent are these differences due to different relative frequencies of the interaction patterns, and to what extent are they due to other factors? To test this, linear models were fitted to the data shown in Figure 3. For example, to examine the importance of interaction pattern and organization in determining the frequency of communication purposes, the entire sample of studies was subdivided into six populations, classified by organization and by whether or not they involved bottom-up patterns (direct, indirect, staff-initiated, or mixed). The dependent variable was defined as the proportion of studies involving the communication motive, while the nominally scaled independent variables were "organization" (Servico, St. Gabriel's, or the CAC) and "interaction pattern" (bottom-up or not). When a simple linear model was fitted using weighted least squares estimation (SAS Institute, 1985: 173), both interaction pattern and organization emerged as significant variables (with $p < .001$). In fact, it appeared that studies at Servico seemed to be consistently less communication oriented than elsewhere, even within the same interaction pattern group. For information and direction and control purposes, only the interaction pattern variable emerged as significant when similar linear models were tested. In the case of symbolic purposes, sample sizes were too small to draw useful conclusions. An inspection of the re-

sults for communication purposes suggests that the way in which the data were grouped in order to create sufficiently large sample sizes for statistical analysis partially influenced the results. Communication is logically much more consistently associated with direct bottom-up studies than with indirect or staff-initiated studies. However, the pure direct bottom-up pattern represents only 15 percent of the Servico bottom-up sample, while it is 60 percent of St. Gabriel's bottom-up sample and 66 percent of that for the CAC.

A more conceptually interesting element of explanation for the differences might be that the professional status of the people involved in analysis may change the dynamics and purposes behind it within the same interaction-pattern group. For example, it could be hypothesized that for top-down patterns (direct delegation, top-down staff studies, or task forces) in organizations involving professional operating staff (St. Gabriel's and the CAC), top-down communication (education) may replace direction and control as a purpose of analysis. But, given the small sample sizes and the small differences (not significant) observed for direction and control purposes, firm conclusions cannot be drawn.

The study seems to indicate that different types of organizations may use formal analysis differently, in ways consistent with the nature of the structural configurations. Machine bureaucracies, with their top-down decision-making style, may use analysis most for information and direction and control purposes, to determine the substance of decisions, and to ensure that decisions made at top levels are detailed and implemented. Professional bureaucracies, in which strategic initiatives often come from the bottom up, may require analysis most for communication (direct persuasion) and information (reactive verification) as proposals move toward approval. Finally, in an adhocracy, the wide participation of individuals in decisions and the ambiguity surrounding formal authority may generate even greater uses of formal analysis for communication purposes (especially positioning and direct persuasion). However, other factors besides structural configuration could affect the relative frequency of different types of motives for formal analysis. The crisis situation at the CAC has already been mentioned as one possible factor explaining this organization's pattern of use for analysis. Other organizational variables with a potentially significant role could include leadership style, ownership (public vs. private), size, or industrial sector. Clearly, much larger samples of organizations are needed to distinguish these different effects and to verify the relationships between structural configuration and uses of analysis.

DISCUSSION AND CONCLUSION

Implications for Theory and Research

The study presented in this paper was exploratory and inductive. The objective was to examine empirically the purposes behind the use of formal analysis in organizations as perceived by organization members and to determine the circumstances under which different types of purposes might emerge. Few links have so far been made with existing trends in organizational theory, practice, and research, al-

though the results are relevant to four very different research streams.

Organizational decision making. Beginning with Lindblom's (1959) classic article, many researchers have effectively demolished the idea that strategic decision making can be accurately described as a comprehensive rational analytical exercise (e.g., Cyert and March, 1963; Allison, 1971; Mintzberg, 1979a; Quinn, 1980) and have suggested that formal analysis has only a partial or "incremental" role to play in decision making. However, very little systematic empirical attention has been devoted to determining exactly how this incremental use of analysis works. Most treatments of organizational decision making still use variants of the stage-based model (e.g., Mintzberg, Raisinghani, and Théorêt, 1976; Simon, 1977; Nutt, 1984; Fredrickson and Mitchell, 1984). But these appear to have limited usefulness for describing the incremental contribution of analysis to decisions, because they de-emphasize the social interactive aspects of the process that are seen here to be critical to an understanding of its role. Some writers focusing more on the political and social interactive aspects of decision making have become interested in the role of formal analysis (e.g., Pettigrew, 1973; Meyer, 1984), but this has rarely been the principal focus. My results suggest a framework for examining the different ways in which the incremental (rather than comprehensive) use of analysis may occur. In another paper (Langley, 1989), I examined specifically how formal analysis studies intervened incrementally in the development of the 27 issues studied in this research, using the typology of purposes for analysis presented here. It was found that different dominant patterns in the sequencing of formal analysis studies tend to emerge for different issues and different types of organizations, confirming the suggestion made above and also put forward by several other writers (Fredrickson, 1986; Shrivastava and Grant, 1985; Hickson et al., 1986) that structural configuration may be an important contingency factor affecting decision-making processes.

Information and principal-agent relationships in organizations. There has been growing interest recently in applying ideas from agency theory to the internal workings of organizations (e.g., Fama and Jensen, 1986; Eisenhardt, 1989; Allaire and Firsirotu, 1990). In fact, the organizational hierarchy can be conceptually viewed as a cascading nested set of principal-agent relationships in which superiors (principals) and subordinates (agents) have diverging goals, and agents tend to be better informed than principals. Agency theory deals with the ways in which appropriate incentives and information systems may be developed to reduce opportunistic behavior on the part of agents. This approach is complementary to that taken by organizational researchers adopting a political perspective (e.g., Crozier, 1964; Pettigrew, 1973; Newman and Rosenberg, 1985), who have shown that control over information is an important source of power. The results presented here clearly fit into this type of framework. They suggest that agents (Ls in my terminology) can be expected to try to retain control over information, while principals (Ms) initiate formal analysis partly to reduce their information disadvantage, sometimes via the use of staff analysts (Ss). In

the mean time Ss are also agents for M, with other diverging goals and other types of information asymmetry. Moreover, they too may suffer from information asymmetry with L and may sometimes be induced to align their goals partly with those of L in order to obtain access to the information they need to satisfy their contract with M. This suggests that a useful and interesting unit of analysis in the study of principal-agent relationships within organizations might be the elemental interaction triad introduced here: Under what circumstances do such triads succeed in reducing information asymmetry and in aligning agents' goals with those of principals, or vice versa? The agency implications of these triads merit further study.

Implementation and the role of staff analysts. This study is also of some relevance to a large body of work on implementation, notably that which examines the factors enhancing or inhibiting the implementation of staff recommendations. Most of this work has focused on the implementation of management science or large computerized information systems (e.g., Doktor, Schultz, and Slevin, 1979; Schultz and Ginzberg, 1984; Ginzberg and Schultz, 1987). However, the key issue of how staff analysts can best achieve acceptance and implementation of their advice seems of interest to people in a variety of advisory roles, from management scientists to strategic planners to policy analysts in government agencies. As Ginzberg (1978) has noted, the literature has consistently identified two factors that enhance implementation prospects in this situation: top-management support and, most importantly, participation of line managers in the project. However, with some exceptions (e.g., Newman and Rosenberg, 1985), most of the implementation literature ignores the fact that staff people very often play a control role of some kind, even if this is not made explicit. In fact, as indicated here, the value of staff analysts to managers lies not only in their expertise but also in the fact that this expertise is independent of other sources of information—such as the line manager responsible for the area concerned. This suggests something that tends to be glossed over in the implementation literature, where emphasis is placed on the importance of participation, good line-staff relations, and the avoidance of line-staff conflict: The effectiveness of the staff-line dichotomy depends on the maintenance of a certain amount of tension between the two. When the tension disappears, the staff may not be doing its job. In fact, overemphasis on the importance of achieving implementation of recommendations may lead to a situation in which it is in the analyst's interest to allow him- or herself to be co-opted by the line. This study suggests that all staff recommendations do not have to be implemented for them to play a useful role in challenging line management. Other ways need to be found of evaluating their usefulness.

Institutional versus rational explanations for the use of formal analysis. In this paper, I asked initiators, executors, and targets of formal analysis why it was carried out, and I obtained a series of answers. But perhaps I did not go far enough. There is always another why: Why was it so important to obtain information? Why would analytic information convince anybody? and Why do people bother so much about rationality or the appearance of it? Institutional theorists

would respond that generally accepted norms force organizations to adopt procedures that are viewed as rational in order to be perceived as legitimate (Meyer and Rowan, 1977; DiMaggio and Powell, 1983; Zucker, 1987). They would further suggest that the public nature of the three organizations concerned would enhance these forces, because organizational survival in the public sector is more likely to depend on public perceptions that management is responsible and that procedures are "rational" than on objective efficiency, which may be difficult to measure. Institutional theorists have also suggested that when institutional pressures are present that force an organization to do things that are not consistent with technical efficiency, then the organization will tend to "decrease internal coordination and control in order to maintain legitimacy" (Meyer and Rowan, 1977: 340). The question is To what extent did these organizations adopt formal analysis because of institutional pressures—or because of pressures for effective decision making? My research was not designed to test institutional versus rational theories of organizing. However, it is interesting to examine how these theories might apply to the three organizations studied.

All three organizations sometimes did formal analysis studies for external consumption: to persuade government agencies to release funds or to symbolize action or rational decision making. They were thus all to some extent subject to institutional pressures for rationality. However, only at the CAC, where symbolic purposes for analysis seemed most common, could the decoupling process suggested by Meyer and Rowan (1977) be clearly observed:

> Before, planning was done merely to present a certain image to the government. It was decided what image to present and a text was invented to go along with it and some figures were put in it. But it didn't bear any relationship to reality. It wasn't done to guide action. The results diverged more and more from reality and things became more and more untenable.

At Servico, institutional pressures for rational procedures were accompanied by very real economic pressures: This organization's outputs were more easily measured than those of the other two organizations, and its board included private as well as public shareholders whose concern was clearly with the bottom line. St. Gabriel's Hospital was a different and rather interesting case. At the time of my study, its adoption of formal analytic procedures seemed to precede institutional requirements rather than to follow them. The CEO had arrived in an organization fraught with problems and had turned it around. But, at the time, government organizations seemed out of step with his new, more rational approach: for example, the organization's first ventures into formal planning were viewed with some anxiety and disapproval by government officials, and the CEO expressed great frustration with government-controlled incentives surrounding health care delivery, which in his view rewarded bad management. The positive results obtained from this internal emphasis on rationality, however, ultimately enhanced the organization's perceived legitimacy both internally and externally, and this organization's use of formal planning and rational methods later became something of a model for others in the health care sector. Like Tolbert and Zucker's (1983) early adopters of

civil service reform, St. Gabriel's Hospital was a source of institutional innovation, rather than a follower of institutional rules, at least insofar as the use of formal analysis was concerned. Given the above, neither purely rational nor purely institutional explanations seem sufficient to explain all uses of formal analysis in the organizations studied.

Conclusion

This study represents an attempt to determine empirically how formal analysis is used in practice. The study was exploratory and based on a limited number of organizations. However, it does suggest a number of avenues for further theoretical development and research. Most importantly, this research emphasizes that formal analysis and social interactive processes in organizations must be viewed as being closely intertwined rather than as mutually incompatible. At the micro level, it is noted that formal analysis studies are carried out within specific social contexts involving different people linked together in hierarchical relationships: some people request analysis, some do it, and some receive it. This study suggests that the purposes of analysis and the political dynamics surrounding it depend on who does what for whom, and, at a more macro level, it appears that the types of uses of formal analysis favored by an organization may depend on that organization's structural configuration. Given the methodological limitations of this study, these propositions need elaboration and verification using larger samples and different methods. It seems clear, however, from this research that a good deal of the formal analysis carried out in organizations might not be necessary if decisions were taken and implemented by single individuals rather than by groups of them interacting with one another. In its use for communication, direction and control, and symbolic purposes, formal analysis acts as a kind of glue within the social interactive processes of generating organizational commitment and ensuring action. Organizations that undertake a great deal of formal analysis may not necessarily be more rational—but they are likely to be more pluralistic.

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APPENDIX A: Classification of Formal Analysis Studies by Analytical Sophistication

Table A.1

Scoring and Criteria for the Classification of Formal Analysis Studies by Analytical Sophistication

Score	Quantitative content	Length of report	Criterion Time input (estimated)	Number of alternatives	Methodology
0	At most one table, graph or figure and at most one page with quantitative data	<10 pages	< 1 person-week	1 with only minimal evaluation	Almost none: "armchair" analysis, formalized intuitive argument
1	At most one table, graph or figure and from 2 to 5 pages with quantitative data	10–24 pages	1 person-week to 1 person-month	1 alternative with substantial evaluation	Simple "soft" approaches only e.g., internal opinion surveys
2	2 to 4 tables, graphs and figures, or 1 table, graph or figure and over 5 pages of quantitative data	25–49 pages	1 to 6 person-months	2 or 3 alternatives or scenarios	Simple "hard" techniques: e.g., budgeting, cost estimates, etc.
3	At least 5 tables, graphs and figures	At least 50 pages	Over 6 person-months	many alternatives (>3)	Complex or multiple techniques, e.g., statistics, computer models, data from diverse sources

Table A.1 summarizes the scoring scheme used to classify studies as more or less analytically sophisticated. Each criterion was scored on a scale of 0 to 3, and the individual scores were summed to obtain a total from 0 to 15. The rationale behind these items was simply that studies that are more quantita-

tive, produce longer reports, require more time, evaluate more alternatives, and use more sophisticated methods can be considered more analytically sophisticated. The scoring approach was validated by selecting three random samples of 31, 16, and 16 studies, respectively, and asking another judge to rank these studies in order of analytical sophistication. The Spearman rank correlation coefficients between the independent rankings and that developed using the scoring method were 89 percent, 93 percent, and 95 percent, respectively. The total scores from 0 to 15 were then divided into four equal categories, as described in the text.

APPENDIX B: The Four Categories of Purposes behind Formal Analysis

The following guide was used to classify formal analysis studies into the four main categories:

1. Information: Analysis initiated to obtain information useful in decision making includes (a) *new knowledge:* seeking information about an issue in an open-minded fashion; (b) *self-confirmation:* seeking information to verify a preconceived opinion or idea; (c) *reactive verification:* seeking backup information in order to check out or complement information provided by another or the same source; or (d) *pulse taking:* seeking input and opinion of others within the organization.

2. Communication: Analysis initiated to communicate ideas to others. This includes (a) *direct persuasion:* using analysis done internally (by oneself or subordinates) to justify or support a given project one wishes to promote with superiors or external influencers; (b) *indirect persuasion:* attempting to persuade superiors or external influencers by using an independent outsider (i.e., not a subordinate) to write an analysis on an issue; (c) *education:* using an analysis process to bring peers or subordinates over to one's point of view; may include use of analysis as "trial balloon," sensitization to issues through analysis, introducing information into a debate to attempt to educate other participants; may also involve participative analysis done in order to try to bring people on board; (d) *consensus building:* use of an analysis process to build a consensus on a given issue through exchange of views; or (e) *positioning:* writing a report to establish one's position on an issue or to structure one's thinking.

3. Direction and control: Analysis initiated to ensure action on the part of subordinates. This includes (a) *direct delegation:* delegating analysis to line managers, technical experts, or task forces for detailing or elaborating major decisions or to ensure action on specific problems; or (b) *outside investigation/assistance:* use of staff analysts, consultants or management outside area most concerned by an issue to investigate problems, ensure that actions are being taken, or to check on what is going on in line areas; may be used when management is dissatisfied with performance or when staff suggestions could be helpful.

4. Symbolic purposes: Analysis initiated for symbolic purposes includes (a) *symbolizing action:* analysis done to give the impression that action is being taken, that a manager has the situation under control, or done to impress others with the manager's dynamism; (b) *symbolizing rationality:* analysis done to send a message that a decision was taken rationally, or done "in case"—for security, to be sure that one can respond to any questions that might be asked now or in the future; (c) *symbolizing participation:* analysis done to give the impression that management is interested in line concerns; (d) *procrastination:* analysis done to gain time or to postpone decision making; or (e) *serendipity:* analysis done because of chance occurrence, e.g., the availability of analytical skills at a given time or done by analysts to keep themselves occupied.

APPENDIX C: The Identification of the Interaction Patterns

To specify the interaction pattern(s) for any given occurrence of formal analysis and superimpose its structure on the elemental interaction triad as described in the paper, the following conventions were adopted:

Definition of major actor types. "Line" people (L) are people who are either formally responsible for or deeply concerned by the issue under study. "Managers" (M) are hierarchically responsible for the line. "Staff" people (S) are individuals who have no formal authority over any aspect of an issue. They may be analysts reporting to managers, or they may be outside consultants hired by anyone. They could also be peers of the line, as long as their

formal responsibilities are unrelated to the issue in any way. Obviously, the identification of who is a line person and who is a manager may shift up and down the hierarchy depending on the level at which analysis is carried out and the identity of the ultimate target. In addition, analysts reporting hierarchically to people classified as line are not considered to be staff but are members of the line group, as are all other subordinates of the line. Outside consultants are considered to be staff, whomever they ostensibly report to. The key assumption here is that external consultants are more independent of their clients than internal analysts, as is evident in the indirect bottom-up study.

Mixed interactions. When two different targets are involved in an analysis in sequence, two different interaction patterns of quite different appearance can sometimes be generated for the same analysis. For example, a senior manager may ask a staff subordinate to study an issue within the domain of a line subordinate and to report to him on it (M-S-M/L—the top-down staff study). The report, or some version of it may then be sent to the senior manager's hierarchical superior (L-L-M—the bottom-up study). Studies in which more than one interaction pattern must be used to fully describe the social context surrounding it are labeled "mixed" in the text: they involve the combination of a top-down configuration with a bottom-up configuration.

Interaction pattern M-L/S-L/M (multidisciplinary task forces). This interaction pattern was used to describe studies done by task forces involving combinations of line and staff people or line people from different functional areas and no staff people. If the line participants were all from the same functional area, and were directed by someone with formal authority over all participants, this situation was treated simply as M-L-M (direct delegation).

Several attempts to characterize the social context surrounding analysis were made before the approach presented here was adopted. The advantage of the current method is that social contexts are classified parsimoniously and fairly accurately without losing too much information. When this approach was applied to the analyses in the sample, it was found that six basic patterns could be used to account for 95 percent of all interaction patterns observed. The exceptions were not frequent enough to be of great interest. In other attempts at classifying the social context, an effort was made to avoid mixed interactions, but this tended to generate interaction patterns that were too complicated. Distinctions between different levels of analysts and managers and between managers and professionals were also included in earlier efforts. These distinctions may have some value as contingency factors affecting the interaction patterns (as suggested in the text), but when used as part of the definition of the concept, they tended to obscure similarities between situations and make the model more complicated than necessary.

APPENDIX D: Absolute Frequencies of Purposes by Organization and Interaction Pattern (Agreed Codes)*

Pattern	Purpose: Information	Communication	Direction & control	Symbolic purposes	Number of studies
Servico (8 issues)					
Direct bottom-up	2	3	0	1	4
Indirect bottom-up	7	3	1	0	7
Staff-initiated	2	1	0	1	2
Direct delegation	2	0	1	2	3
Top-down staff	5	1	2	0	7
Multidisciplinary task force	3	0	4	0	4
Mixed	8	5	7	1	13
Unclassified/other	0	0	1	0	1
Total	29	13	16	5	41
St. Gabriel's (10 issues)					
Direct bottom-up	2	12	0	1	12
Indirect bottom-up	2	1	0	0	2
Staff-initiated	1	1	0	0	2
Direct delegation	4	1	1	0	5
Top-down staff	2	2	1	0	3
Multidisciplinary task force	5	3	4	3	9
Mixed	4	1	0	3	4
Unclassified/other	1	0	0	0	1
Total	21	21	6	7	38
CAC (9 issues)					
Direct bottom-up	3	30	1	3	31
Indirect bottom-up	4	6	1	3	6
Staff-initiated	5	5	0	2	7
Direct delegation	11	5	7	1	16
Top-down staff	6	3	2	0	8
Multidisciplinary task force	5	3	4	5	7
Mixed	1	2	2	1	3
Unclassified/other	1	4	1	3	5
Total	36	58	18	18	83
Total (all organizations)	86	92	40	30	162

* Data for unclassified/other configurations are not included in the analysis of Figure 3 but are used in the overall comparison of the three organizations in Figure 4.