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Richard J. Boland, Jr.
Ralph H. Greenberg

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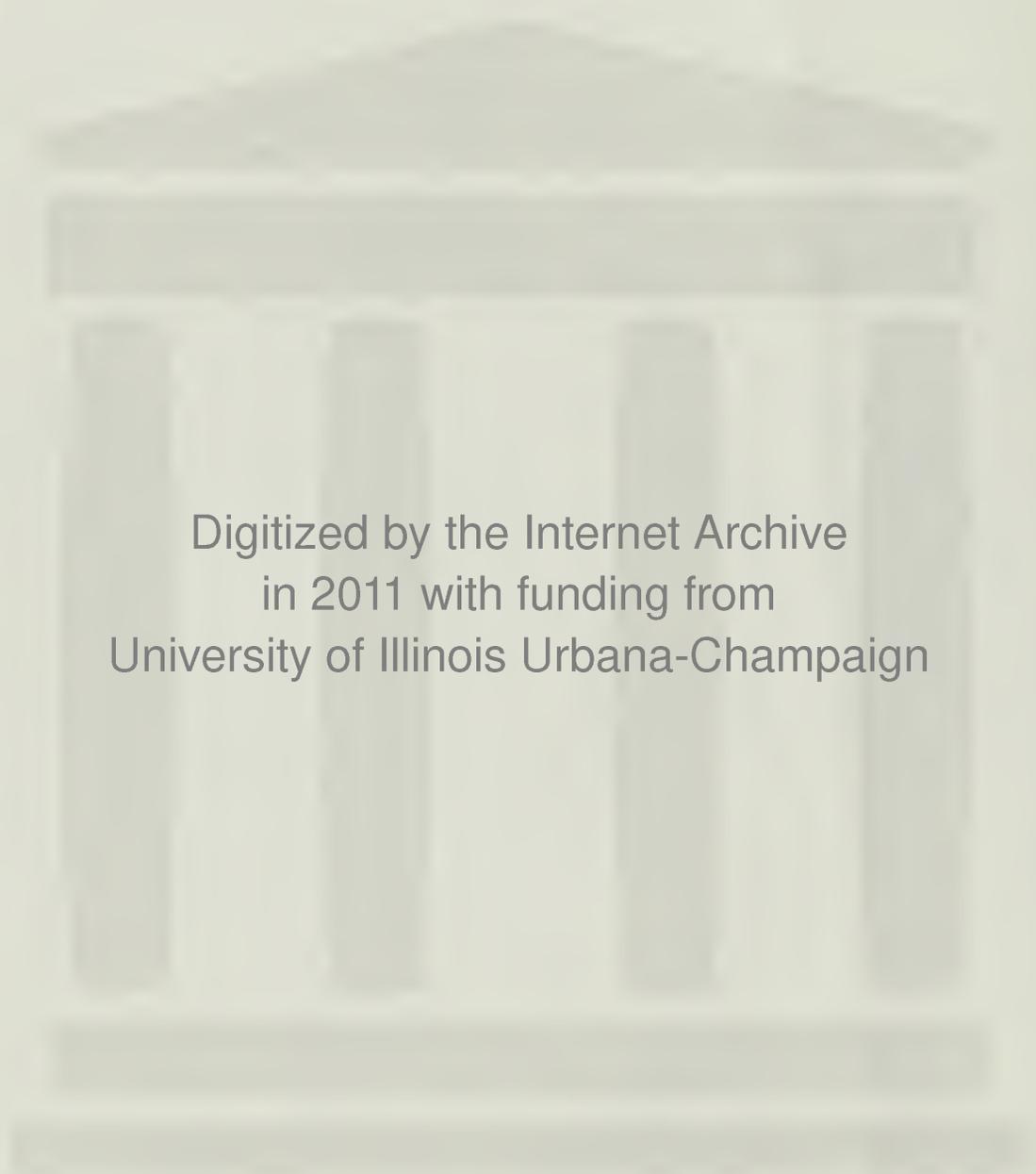
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Method and Metaphor in Information Analysis

Richard J. Boland, Jr., Professor
Department of Accountancy

Ralph H. Greenberg, Assistant Professor
Department of Accountancy



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Abstract

Information systems are designed to solve organizational problems. But where do those problems come from? Information analysis as a method of information system choice presumes that organizational problems are just simply there - a given to be illuminated through accurate description. Some recent work emphasizing the rhetorical nature of economics and social science in general, suggests instead that the organizational problems we take as a given are the product of an interpretive process rather than an observational process, and are more a question of finding meaning through literary criticism than of making an accurate representation of the simply given. This paper reports on a study of systems analysts and the way metaphor is involved in their interpretations of organizational problems and their proposals for information system solutions. It shows them using different metaphors to read the organization and interpret its problems in radically different ways. Information system analysts must become critical of the metaphors that shape their organizational analysis, or they will remain blind to where their problems come from.

Introduction

A rather naive questioning prompts the studies reported in this paper. An archetype for this kind of naive questioning comes from the recollection of an MD, renowned for his studies in genetics, who was asked by a reporter how he became interested in his area of research. His name and important discoveries have faded from memory, but not his answer. "It all goes back," he said, "to one simple question that I asked myself when I was very young: Where do babies come from? I have been searching for the answer all my life."

Our area of interest is the design of information systems: the way information technologies are linked with changes in organizational procedures to create systems that solve organizational problems. The reliance on information systems is a defining characteristic of our age. From industry to government to health care and other professions, we look for applications of information technology to solve our problems. In fact, we call this the information age and talk about our movement toward the information economy. It is in the face of this pervasive problem-solving application of information technology that we pose our naive question: "Where do problems come from?"

A standard method for the selection of appropriate (value maximizing) information systems is information analysis (Feltham and Demski, 1970; Demski, 1980) as based on statistical decision theory (Raiffa and Schlaifer, 1961). Information analysis, and theories of choice in general, presume that the problems which information systems help to solve are a given. The decision maker is confronted with a choice in a situation that is just simply there - a situation that is merely presented to the decision maker.

We resist the presumption that problems are simply there, to be set before a decision maker and examined with a clear gaze. The assumption that the

social world is a given, an object that can be accurately described if the proper procedures are followed, and that the "real work" of information analysis is to develop a method of choice among alternative technologies to "solve" the problem, is an assumption that information analysis adopts too uncritically. It adopts this assumption as part its accepting the orthodox image of scientific method that predominates in much of American social science. Because of the widespread acceptance of the orthodox image of science and the simply given nature of social reality, we see that "mere description" is a derogatory term, especially in information systems, economics, accounting, and related business disciplines.

In this paper, we will critique the "presented object" view of social reality and propose an alternative, interpretive view along with an example of an interpretive study of where problems come from. We will begin by exploring the orthodox image of social scientific method that lies behind the "presented object" assumption.

The Orthodox Image of Social Scientific Method

The "orthodox" or "received view" holds that social science should, as nearly as possible, resemble a rigorous image of natural science.

As long as there has been a social science, the expectation has been that it would turn from its humanistic infancy to the maturity of hard science, thereby leaving behind its dependence on value, judgment, and individual insight. The dream of modern Western man to be freed from his passions, his unconscious, his history, and his traditions through the liberating use of reason has been the deepest theme of contemporary social science thought. (Rabinow and Sullivan, 1979, p. 1).

Yet, in light of recent work in philosophy (Rorty, ; Habermas ; Gadamer, ; Derrida,) and in social theory (Foucault, ; Giddens, ; Bernstein, ; Sahlins) the orthodoxy would appear to be something of an anachronism. These recent writings are based on problems of language and human agency that are ignored by the orthodox view, but severely undermine its claims to legitimacy.

McCloskey (1983) presents an eloquent critique of the orthodoxy as it is found in the work of economists. McCloskey points out that for all the economists' hard talk of rigorous methodologies, the asserted standards of orthodox social science are not to be found in their actual behavior:

They claim to be arguing on grounds of certain limited matters of statistical inference, on grounds of positive economics, operationalism, behaviorism, and other positivistic enthusiasms of the 1930's and 1940's. They believe that these are the only grounds for science. But in their actual scientific work they argue about the aptness of metaphors, the relevance of historical precedents, the persuasiveness of introspections, the power of authority, the charm of symmetry, the claims of morality (p. 482).¹

¹McCloskey is used as an example of this kind of critique from a related discipline. Voices like McCloskey's, which question the tenets of the received view, are only beginning to be heard in accounting (Arrington, ; Neimark and Tinker,). In social theory, Anthony Giddens (1976, 1979, 1984) has extensively critiqued the orthodoxy of social science that predominates the American academic scene. Later in the paper we will use Giddens in an interpretive study, and will draw on the structuration theory he purposes as an alternative to the functionalism of the orthodox methodologies.

Social Science as a Rhetoric

McCloskey argues that the orthodox image of science in economics is obsolete in philosophy where it originally looked for its guarantee, that it is impossible to actually practice, and that it is not followed by other sciences. In place of the received view, he proposes we accept economics (and other social sciences) as a rhetoric; an art of disciplined conversation marked by mutual interaction, exploring good reasons for our beliefs through discourse. Thus, he claims, economics is a literary matter, an interpretive act more akin to literary criticism than physics. He proceeds to explore the metaphorical nature of the models and mathematics of economics to demonstrate its rhetorical character. Arguing that economics is a rhetoric is not to demean it, but merely to accept social science as the social practice of dialogue that it is.

The invitation to rhetoric, however, is not an invitation to irrationality in argument. Quite the contrary. It is an invitation to leave the irrationality of an artificially narrow range of arguments and to move to the rationality of arguing like human beings. It brings out into the open the arguing that economists do anyway - in the dark, for they must do it somewhere and the various official rhetorics leave them benighted (p. 509).

If we accept economics and other social sciences as a rhetoric, then we see that any claim to an officially certified method of inquiry that provides privileged access to reality is a hinderance to the dialogue of science. It narrows, confines, stops and generally dulls the discourse of science. Thus, McCloskey concludes:

Economists should become more self-conscious about their rhetoric, because they will then better know why they agree or disagree, and will find it less easy to dismiss contrary arguments on merely methodological grounds (p. 482).

We concur with McCloskey's conclusion, as far as it goes. Returning to the questions of this paper (where do problems come from?) McCloskey helps us see that problems are found through discourse. The less hide-bound a discourse is, the less we deny assertions merely on methodological grounds, the better off our social science will be. But McCloskey only considers the rhetorical nature of science, whereas his observations hold equally well for the larger social reality.

The writers McCloskey draws upon or implies in developing his argument speak not only about the methods of social science, but the character of the social world as well. Both social science and the social world it studies are engaged in a search for meaning. The search for meaning in both science and society is, as it were, where the problems we are naively questioning come from. Everyday action in organizations is a search for meaning and gives rise to the problems that information system choice takes for granted as givens. The problems addressed by information systems emerge through the rhetoric of both economic scientists and organizational actors. Further, going behind McCloskey, to his sources and their references, leads us to conclude that neither the organizational rhetoric, nor the social science rhetoric, can result in a single, stable, reliable interpretation of the problem(s) an organization has.

It leads us to propose that the problems an information system will face are not simply there in an organization, to be illuminated and made clear. They are, instead, a product of our discourse and interpretive efforts which

have no final stopping point. There are always good reasons for another interpretation of a situation, always a different problem to be seen. Clarity of vision won't help reduce the infinity of possible interpretations that can produce organizational problems. An information analysis that assumes organizational problems are a given, simply there to be described accurately, is misguided.

Textuality and Interpretation Replaces the Rigor of Privileged Method

Accepting the interpreted nature of the actors' world makes the social scientists role as an observer a bit difficult. A strongly orthodox social science requires brute, hard facts: interpretations and meanings won't do. Taylor (1971) discusses some of the problems a world of meanings and interpretations pose for the empiricist, especially the difficulty of accepting man as a self-defining being. As soon as the empiricist makes a statement about the social world, that statement is interpreted and becomes a part of the system of meanings on which social action is based - potentially altering the "brute facts" behind the statement and thus the world the empiricist had taken for a given.² Taylor then directs our attention to the importance of hermeneutics in the science of man. Hermeneutics is the discipline of interpretation, originally associated with interpreting historic religious texts, now seen as a necessary element in the broader study of society.

A major voice in the renewed interest in hermeneutics today is Hans-George Gadamer (1975, 1976, 1981). Gadamer emphasizes that interpretation is an historic act, unfolding in time and importantly grounded in tradition. Because of the necessity of tradition in interpretation, it is impossible to strip away all assumptions as a guarantee of objective knowledge. The type of

² The preinterpreted nature of the social world and its implications for doing social science is also importantly explored by the critical theory of Habermas ().

interpretive understanding of the world we can achieve is never a fixed, end-point but always a moving dialectic process. In our everyday experience, the world confronts us as something alien. It is a world with meanings not of our own making that we must learn to read and interpret in order for our intentional actions to be possible. This is a hermeneutic problem we all face. It is the universal hermeneutic problem.

A science of information systems that fails to appreciate that acting through language is constitutive of the social world, and that the hermeneutic problem is universal draws special criticism from Gadamer:

There would be no speaker and no art of speaking if understanding and consent were not in question, were not underlying elements; there would be no hermeneutical task if there were no mutual understanding that had been disturbed and that those involved in a conversation must search for and find again. It is a symptom of our failure to realize this and evidence of the increasing self-alienation of human life in our modern epoch when we think in terms of organizing a perfect and perfectly manipulable information... (1976, p. 25)

The theme of the world-as-a-text and the universal hermeneutic problem is behind McCloskey's call for a rhetoric of economics, and it helps to strengthen his claim for the textuality of science. A major source for McCloskey's position is Richard Rorty () who traces his studies in philosophy back to a question which, curiously enough, is a kind of answer to ours. After recounting a number of his teachers and their impact on him, he observes:

I was very fortunate in having these men as my teachers, but, for better or for worse, I treated them all as saying

the same thing: that a "philosophical problem" was a product of the unconscious adoption of assumptions built into the vocabulary in which the problem was stated - assumptions which were to be questioned before the problem itself was taken seriously (1979, p. xiii).

Rorty has developed a strong pragmatic position that denies any philosophical basis for claims to a method that would guarantee the correspondence of our scientific statements to an external reality. In discussing the kind of textualist position we have developed through Gadamer, he characterizes it as a pragmatist one.

I think we shall best understand the role of textualism within our culture if we see it as an attempt to think through a thorough-going pragmatism, a thorough-going abandonment of the notion of discovering the truth which is common to theology and science.

...The pragmatists reminds us that a new and useful vocabulary is just that, not a sudden unmediated vision of things or texts as they are (1982, pp. 152-153) (emphasis in the original).

Rorty sees the search for a method of science that promises a privileged access to reality as misguided. Rorty suggests the hermeneutic dialogue and its open search for meaning be accepted as an alternative to any method that promises to mirror reality as a guarantee for our knowledge. Conversation and social practice justify our knowledge of the world, not a method of accurate representation.

The crucial premise of this argument is that we understand knowledge when we understand the social justification of

belief, and thus have no need to view it as accuracy of representation (1979, p. 170).

Rorty's position is developed through a holistic argument similar to that pursued by Churchman (1971). Both confront us with the inevitability of the hermeneutic circle of interpretation, in which an adequate understanding of the parts of a system requires an understanding of how the whole works, but an understanding of the whole only comes after we have some understanding of the parts.

This notion of interpretation suggests that coming to understand is more like getting acquainted with a person than like following a demonstration. In both cases we play back and forth between guesses about how to characterize particular statements or other events, and guesses about the point of the whole situation, until gradually we feel at ease with what was hitherto strange (Rorty, 1979, p. 319).

An Experiment that Interprets Interpretations

It is with this strong sense of the unavoidably metaphoric character of language and the textual character of society and its science that we approach the problem of information system analysis and our naive question of where problems come from. We want to go beyond McCloskey's discussion of economics as a rhetoric and beyond Rorty's denial of any philosophic claim to a privileged language for presenting a mirror of reality. We want to reassert Gadamer's position on the universality of the hermeneutic problem.

It is not just scientists and science we are interested in, but the everyday actors who create and sustain the social world through their day to day activity. This day to day activity is essentially symbolic and metaphoric.

We are always seeing one thing in terms of another - there is no passively received, purely literal knowledge to which the symbolic function merely adds color. The symbolic, interpretive action of a social actor is the text that we want to read, it is a text generated by them as they read the texts of their social world. Thus, as social scientists, our task is not just a hermeneutic, but a double hermeneutic (Giddens, 1976, 1979, 1984). To gain insight into where problems come from, we will try to read and interpret actors as they read and interpret their situation.

Information system design is textual in that the analyst, in defining what information technology should do for an organization, reads the organization as one would read a text. The reading of the organization by an analyst is an interpretative reading. The analyst applies schemas or frames which suggest plausible combinations of entities, attributes and events in the situation (Sowa, 1984, p. 128) as a basis for making sense of the situation. The metaphoric process of seeing one thing as another is fundamental to the use of schemas (Butler, 1984). It leads Lackoff and Johnson (1980) to argue that all thought is vitally metaphoric. They demonstrate how the ordinary conceptual system guiding our everyday thought and action is structured by metaphors based on our everyday experience of standing, walking and generally being situated in the world.

As a first, simple step in exploring the textuality of organizational analysis during information system design, we create a mild manipulation of the metaphors used by subjects during a systems analysis exercise. If subjects just use metaphors as a way of colorfully expressing their thoughts about a situation, we should see no real differences in the problems they see in an organizational case study, or the solutions they propose. If, on the other hand, they actively read and interpret the situation through the metaphorical

frame we induce, we would expect the different schemas provided by the different metaphors to result in different interpretations. Different metaphorical frames should highlight and hide different possible ways of reading the organization as a text. (Lackoff and Johnson, 1980; Butler, 1984). We have developed a laboratory exercise in which subjects first work in a group to create a metaphorical framework, and then work separately, using this metaphorical framework, to analyze a business case study. The questions we ask are: do people using different metaphorical frames see different problems? and, do different metaphorical frames result in different solutions to the problems they do see?

The two metaphors we use in this experiment are the organism and the machine. Morgan () identifies the organism and the machine as the two most frequently invoked metaphors in organization theory. They are primarily structural metaphors, which pose puzzles of matching structural requirements of the organization to various features of their task, technology or environment. The machine metaphor, he argued, provides emphasis on static, formal structure, as in a blueprint. It suggests a closed system concerned with the rational, efficient accomplishment of prespecified ends in which people are valued instrumentally. The organism metaphor, on the other hand, emphasizes the dynamic, mutual dependence of sharing a common life, interacting with an environment, and being in the constant flux of change.

Because both are structural metaphors and because both are capable of producing rich and complex images, we feel it is a good first test for the relation of metaphor to organizational problem formulation. If subjects could analyze a case situation, define the problem(s) in the case and propose solutions without being influenced by the metaphorical framework we introduce, they should be able to express any ideas they may have developed equally well

with either the mechanistic or organistic metaphors. Therefore, any differences we encounter should not be due to limitations on their ability to express themselves with one metaphor versus the other, but due to different interpretations of the text associated with the different metaphors.

Description of the Experiment

We have conducted the experiment with both students and practicing professionals. Student subjects (N = 42) were undergraduate business majors who volunteered for a "problem solving exercise." Practicing professionals (N = 52) were management consultants and auditors from two international accounting firms with one to three years experience who were provided by their employers as their scheduling allowed. The experiment was administered to small groups of six to ten subjects each.

At the beginning of the session, subjects were told that we were interested in problem solving during system design. They were told that there was no 'trick' or hidden variable in our experiment. It was pointed out that metaphors and analogies were a common device for making sense of a new situation, and that they would be using a problem solving technique based on a vocabulary of metaphorical images. They were told that their group would use one central metaphor and other groups would use other central metaphors. We were interested in how people in different groups were able to use the different metaphors in problem solving. The experiment, therefore, depended on them doing the best they could to create and use a vocabulary of images to analyze a case situation. They were further told that they would first spend about twenty minutes in a structured group technique to create a vocabulary of images and would then be given a case study to analyze. They were assured that the entire exercise would last less than 90 minutes.

To set the stage and create a context for the experiment, subjects were asked to imagine that they were not employed by their current employer, and that they lived in another city in a different part of the country (Pittsburgh or Sante Fe, depending on metaphoric condition). Subjects were told they had just been hired by a consulting firm and this was their first training session. They then received the initial written instructions shown in exhibit 1. The moderator read these instructions aloud as the subjects read along silently. The initial instructions further set the context and told them their new employer had a distinctive framework of analysis which used metaphoric images and was based on the philosophy of its founder. In the organistic condition they were told the founder often said, "in order to understand organizations properly, you have to understand that they are just like a forest: lots of plants and animals all living together." In the mechanistic condition, they were told that the founder compared organizations to a factory with "lots of different machines, all working together."

The training method employed a nominal group technique in which the subjects were asked four questions, one at a time. After each question was asked, subjects were given several minutes of silence to write down their ideas in response. The moderator then called on subjects one at a time to read one of their answers which an assistant wrote on a blackboard in front of the room. This continued until no subject had any more ideas to add. This procedure was followed for each of the four questions. The four questions were:

- 1) Name some _____ . (plants and animals/machines)
- 2) Name some characteristics of _____ .
- 3) Name some things that can go wrong with _____ .
- 4) Name some things you can do to improve or correct _____ .

In this way, subjects themselves created the complex set of metaphorical images that would guide their later analysis. Examples of the ideas produced by each of the conditions in response to these four questions are shown in tables 1 and 2. At this point, the moderator distributed a short case study (Exhibit 2) and gave subjects ten minutes to read the case. Subjects were then asked four questions, one at a time, and allowed ten minutes between each question to work independently and write their responses. The four questions were:

- 1) Use whatever (machine/plant or animal) images you feel are appropriate for describing this situation. You may use any ideas from the board or any other ideas or images that may occur to you in describing the situation. Your first sentence would begin, "this situation is like a".
- 2) Give a clear, concise statement of the problem(s) at Bingham Boatyard.
- 3) Propose a solution to the problem(s) at Bingham Boatyard.

The subjects' written responses were content analyzed by two different pairs of raters. Each pair read and discussed the write-ups, and reached agreement on the statements of the problem and the alternative solutions they contained. Tables 3 through 8 present the frequency of problems and recommendations by condition for the student and professional subjects. The raters had Spearman Rank order correlations ranging from .60 to .81 for the statements of the problem and problem solution for the two conditions and two sets of subjects.

Interpretation of Results - Statements of the Problem

Results of the content analysis, showing problem statements and problem solutions for the professionals and the students, separately and combined are presented in tables 3 through 8. A first observation is that the two sets of subjects do not interpret the situation in the same way. This is to be

expected, as they have different levels of experience, and indoctrination into organizational life. The professionals saw problems with leadership style, power, departmental coordination and performance evaluation systems to a greater extent than students, and students saw problems of organization structure, resistance to change and lack of managerial talent to a greater extent than did the professionals. In this first reading of the data, however, we will focus primarily on the combined statements of problems and solutions for both subject groups (tables seven and eight).

As we interpret our subjects interpretations, we first look for those ways in which the two metaphorical conditions differentially highlighted certain aspects of the situation and hid other aspects. In this respect, we identify three themes along which the highlighting and hiding role of metaphor seems to be operating; an external, environmental theme and two internal themes - one focusing on power and leadership, the other focusing on efficient coordination of components. The organic metaphor appears to have emphasized the organization's relations with its environment, and internal dynamics of power and leadership. The mechanistic metaphor, on the other hand, seems to have removed these elements from consideration. Similarly, the mechanistic metaphor seems to have highlighted the internal efficiency and coordination of the organization, whereas the organic metaphor seems to have kept that internal dynamic out of consideration.

Problem StatementsExternal, Environmental Theme

<u>Coding Element</u>	Organistic		Mechanistic	
	<u>Freq.</u>	<u>% of Sub.</u>	<u>Freq.</u>	<u>% of Sub.</u>
Lack of interaction with environment	7	14.0%	0	0%
Lack of adaption to changing environment	<u>14</u>	28.0%	<u>2</u>	4.5%
	21		2	

Internal, Power and Leadership Theme

<u>Coding Element</u>	Organistic		Mechanistic	
	<u>Freq.</u>	<u>% of Sub.</u>	<u>Freq.</u>	<u>% of Sub.</u>
Change in leadership style	11	22.0%	4	9.1%
Lack of adaption to evolving internal needs	8	16.0%	4	9.1%
Constraints to growth from internal dynamics	18	36.0%	1	2.3%
Lack of managerial power	<u>5</u>	10.0%	<u>1</u>	2.3%
	42		10	
	=====		===	

Internal, Efficiency and Coordinated Effort Theme

<u>Coding Element</u>	Organistic		Mechanistic	
	<u>Freq.</u>	<u>% of Sub.</u>	<u>Freq.</u>	<u>% of Sub.</u>
Changing too fast, situation too complex	1	2.0%	6	13.6%
Operational efficiency	3	6.0%	9	20.5%
Lack of coordinated effort	<u>1</u>	2.0%	<u>12</u>	27.3%
	5		27	
	=		==	

In addition to these themes of differential highlighting and hiding, there are two common themes we would like to point out. The first is an organization structure theme which is of interest because of the different way subjects in

the two metaphorical conditions saw organization structure as a problem. In the organistic condition, they tended to see the structure as a problem because it was too centralized, where as in the mechanistic condition, they saw it as a problem because the structure was too decentralized.

Problem Statements

Organization Structure Theme

<u>Coding Element</u>	Organistic		Mechanistic	
	<u>Freq.</u>	<u>% of Sub.</u>	<u>Freq.</u>	<u>% of Sub.</u>
Change in organizational structure	3	6.0%	1	2.3%
Too much decentralization	1	2.0%	13	29.5%
Too much centralization	9	18.0%	4	9.1%

A final theme that appears to be held in common by the two conditions based on the content coding is a lack of management control theme. This apparently common theme will be explored later as we extend our interpretation beyond a simple count of the times a coding element was mentioned.

Problem Statements

Management Control Theme

<u>Coding Element</u>	Organistic		Mechanistic	
	<u>Freq.</u>	<u>% of Sub.</u>	<u>Freq.</u>	<u>% of Sub.</u>
Conflict over functions and responsibilities among managers, lack of cooperation, agency problem	23	46.0%	17	38.6%
Inappropriate performance measurement/ transfer pricing	20	40.0%	22	50.0%
Lack of clear, shared goals and inadequate planning	12	24.0%	13	29.5%

These different treatments of problem statement themes are very much in keeping with the differential use of the organistic and mechanistic metaphor attributed to organization theorists by Morgan (1978, 1986) and the classic

distinction of organistic and mechanistic organizations by Burns and Stalker (1960). In the organistic condition, subjects emphasize relations with the environment, organizational power and leadership, and growth dynamics. They are concerned by too much centralization. In the mechanistic condition, on the other hand, subjects are concerned with the efficient coordination of effort, and worried that the organization has become too decentralized.

The different treatment of these themes by our subjects is very intriguing to us because it suggests that organization actors using everyday language with central metaphors similar to that of social scientists, will tend to reproduce the social science theory in their situated action. This tends to support some of the basic propositions of Anthony Giddens's "structuration theory" concerning the role of the actor vis a vis social theory which we will discuss further later in the paper.

Interpretation of Results - Statements of the Proposed Solution

Solutions proposed by subjects in the two conditions are consistent with the different problem statements they had developed. Of primary interest are the different solutions proposed on the organization structure theme. Subjects in the organistic condition tend to propose a move toward a decentralization, while those in the mechanistic condition tend to propose a move toward centralization. Classifying subjects as having suggested decentralization, centralization or neither allows a Chi Square to be performed on the independent conditions and reveals a χ^2 of 9.68, significant at the .01 level.

Condition

<u>Problem Solution</u>	<u>Organistic</u>	<u>Mechanistic</u>	<u>Total</u>
Decentralize	19	10	29
Centralize	3	13	16
Neither	28	21	49
Total	50	44	94

In keeping with their problem statements, subjects in the organistic condition proposed solutions which addressed their concerns about problems with environmental relations, growth dynamics and the sharing of administrative leadership and power.

Problem SolutionEnvironment, Power and Leadership Theme

<u>Coding Element</u>	<u>Organistic</u>		<u>Mechanistic</u>	
	<u>Freq.</u>	<u>% of Sub.</u>	<u>Freq.</u>	<u>% of Sub.</u>
Create lateral interaction/ integration across departments	20	40.0%	8	18.2%
Improve interaction with and understanding of environment	12	24.0%	1	2.3%
Improve executive cooperation/ confidence/pride	16	32.0%	7	15.9%
Remove constraints to growth, give room to grow	5	10.0%	0	0%

Thus far in our reading of the subjects' reading of the case study in our exercise, many of our earlier images of the textuality of organizational analysis and the fundamental role of metaphor in shaping organizational discourse and interpretation appear to have been born out. The results suggest that organizational analysis is a rhetoric and that the metaphors we draw upon

to frame our analysis of organizational situations can radically affect the kind of analysis we will make.

Subjects in the two conditions, using the two most commonly referenced organizational metaphors, show rather dramatic differences in their reading of the organizational situation. Returning to our original question (where do problems come from?) this experiment lends support to the view that problems emerge through readings of the organization as a text. Using different metaphorical imagery, subjects bring the problems of the organization into being in different ways. In this case, the subjects reproduced the distinct organizational elements that have been observed in social scientists using the same metaphors. It is our position that metaphor and the textuality of organizational analysis are not merely instances of bias in the otherwise unproblematic description of what is simply there in an organizational setting, but are vitally involved in the way we bring organizational situations into being and make them real.

Interpretation of Results - Qualitative Analysis of the Text

After reading and rereading the subjects responses, we did not feel that the widely shared problem statement categories that we earlier discussed under the heading of management control provided an adequate reading of what the subjects were saying. The content categories were being mentioned, but there appeared to be several different senses in which they were being used. An inappropriate performance measurement system was the most frequently cited problem statement across conditions, mentioned by over 46% of the subjects. Conflict over functions and responsibilities was the second most frequently cited problem statement across the two conditions, mentioned by 42% of all subjects.

Yet, there seemed to be more at work here than a widely shared perception. The subjects seemed to be saying the same things, but for different reasons. In the organic condition, subjects referred to the managers' lack of freedom and sense of being trapped when raising these categories, whereas subjects in the mechanistic condition referred to a logical misfit between the authority granted to the managers, and the responsibility they were being held to.

Further, we felt there were a range of subtle ways in which the organization and its environment were being discussed, that a count of categories might not reveal. There were also very different senses of the historical, evolving nature of the situation, ranging from the ahistorical to the trans-generational. Finally, creating a participative process for the managers was a widely cited problem solution element in both conditions, yet it sometimes was suggested as a manipulative device and other times was suggested as a true sharing of power and decision making. This difference was potentially important, but was not revealed by the content coding. We see this sense of an inadequate coding on our part as an example of the back and forth dialogue with a text, the reading, interpretation and rereading, that characterizes a hermeneutic process.

Accordingly, we returned to the subjects' responses, and recorded the data on a more qualitative basis. Each subject's response was reread and evaluated on four dimensions, using a Likert type scale. The four dimensions were chosen to reflect qualitative differences encountered in a reading of the responses that the content coding did not seem to capture. The four dimensions were:

1. The organization and its environment. Was the organization discussed as an isolated entity or as a sub-unit in its environment?

Isolated Entity						Sub-unit in Environment
/-----/-----/-----/-----/-----/-----/						
-3	-2	-1	0	+1	+2	+3

2. Time. Was the situation discussed as a continuous process over time, or as an isolated event in a single time period?

Continuous Process Over Time						Single Time Period
/-----/-----/-----/-----/-----/-----/						
-3	-2	-1	0	+1	+2	+3

3. Participation. If participation by managers was discussed, was it discussed merely as a way to "sell" a solution to them to motivate them or as a way to genuinely involve them?

Way to Sell and Motivate						Way to Genuinely Involve
/-----/-----/-----/-----/-----/-----/						
-3	-2	-1	0	+1	+2	+3

4. Performance Measurement System. Was the problem with the performance measurement system discussed as an emotional, moral one in which people were trapped, stifled or unfree, or was it discussed as a rational inconsistency characterized by a misfit between responsibility and authority?

Emotional/ Moral						Rational Inconsistency
/-----/-----/-----/-----/-----/-----/						
-3	-2	-1	0	+1	+2	+3

Results of this second, qualitative coding of the professionals' responses lent some further support to the position that the subjects using the organic

and mechanistic metaphors tend to reproduce the differences proposed by organization theorists for these two images of organization. (Results in table 9 are preliminary, based on one coding. A second coding with interrater reliability is in process). Although the time dimension showed no apparent differences, with subjects in both groups primarily using a short, single-time period view for their analysis, the organization dimension revealed subjects in the organic condition to be viewing the organization more as a sub-unit in the environment as opposed to the isolated entity view of the mechanistic condition (.01 level). There was also some indication (.10 level) that subjects in the organic condition used participation more as a way to genuinely involve managers in decision making than did subjects in the mechanistic condition. Finally, subjects in the organic condition tended to see the performance measurement problem as an emotional, moral one whereas subjects in the mechanistic condition saw it as more (.01 level) of a rational inconsistency or misfit.

The Performance Measurement System as Organizational Contradiction

We will look to Anthony Giddens for a basis in social theory on which to further interpret this finding of a difference in our subjects reading of the performance measurement problem. In so doing, we hope to show how the kind of grounded, interpretive study we report here can not only draw from existing social theory in making an interpretation, but can also add back to it. Using Giddens' terminology, we will interpret the performance evaluation problem identified by our subjects as their recognition of a contradiction in the organization. What we can add back to Giddens is an awareness that in keeping with his theory, there is a shared knowledge of contradiction among organizational actors, but that the meaning of that contradiction to the actors is not a unified, homogeneous one, as he would suggest. In this case,

different metaphorical vocabularies resulted in different meanings for the commonly recognized contradiction.

We will use Giddens and his theory of structuration as a basis for our interpretation because he builds his theory on a theory of action. He thus links more traditional macro-sociological concerns, such as organization theory to the individual actor and to the micro-level processes of face-to-face interaction and communication. He demands that we respect the individual actor as the generative source of institutional features such as organization structures. A central idea for his theory of action is that individuals as members of a culture are skilled and knowledgeable about that culture. They "know how to play the game". This means that they not only can speak about what things are done and how things are done in their society, they also possess skills for acting in the culture and for monitoring and changing their actions in specific circumstances that are only known by them tacitly. In the sense of Polany, "they know more than they can say."

From his theory of action perspective, Giddens argues that an organization structure is indeed a pattern, but not a pattern that can be grasped with a static "snapshot" of an organization. The pattern of organization structure endures over time and is only revealed to us as we study processes of interaction that maintain the pattern over time. Only by observing that action can we observe organization. Hence, Giddens emphasizes the continuous production and reproduction of organizations by skilled actors. An organization is never simply given, but is always being reproduced.

In Giddens theory of action, social systems are produced through structuration. Structuration is the process by which responsible, skilled agents draw upon structure (mutually understood rules and resources) in order to act and to reflexively monitor, adapt and change their action. The

structures that individuals draw upon in producing social systems are of three main types, which correspond to the requirements of communicative interaction. Actors draw upon; (1) interpretive schemes in order to make sense of their own and others actions; (2) standards of morality in order to make judgments of goodness and badness and 3) sources of power in order to effect desired outcomes.

Giddens gives considerable space to discussing the contradiction of structural properties that is an essential feature of any social system. By contradiction of structural properties he means modes of structuration which tend to be drawn upon simultaneously, but also tend to contradict each other - to work against each other and set the conditions for each others failure. Giddens draws on Marx to declare the fundamental contradiction of our age of late capitalism as the contradiction between the private accumulation of capital and the socialized process of production. In a less dramatic vein, the needs of the individual for self-assertion and strong ego identity are in fundamental conflict with the orderly, cooperative functioning of a group. As a result, contradiction, dilemma and paradox are essential features of social systems and the process of structuration that produces a given organization can be expected to be in constant tension from contradictory structural properties.

In our experiment the subjects recognize a contradiction similar to that proposed by Giddens. It is a contradiction because the rules at work in the organization tend to undermine each other. One rule holds managers responsible for the profits of their division. If managers are to be truly responsible for profits, they should have the authority to buy and sell as they please, but they do not have this authority. Instead, because the divisions of the firm are interdependent, division managers are ordered by the president to buy and sell between divisions, even though they could apparently obtain better prices

outside. One rule says the division is responsible as an autonomous entity, the other rule says the division is only authorized to act as a coordinated part of the larger organizational entity. Both rules are enacted in the name of profit, but both tend to undermine each other. To follow one is to contradict the other.

Both Giddens and accountants recognize that this type of contradiction is inherent in the attempt to measure the performance of individuals in large, complex organizations. What intrigues us is the different way the contradiction is read and interpreted by knowledgeable actors using different metaphors. Using organic metaphors, our subjects read a situation that is unfree, stifling, emotionally trying and morally troubling. The solution they propose follows this reading of the contradiction and restores the managers freedom through decentralization and increased authority. Subjects using mechanistic metaphors read a situation that has a logical inconsistency or misfit between responsibility and authority. The solution they propose follows this reading of the situation and goes approximately equally in each direction that the misfit could be cured. The subjects in this condition are split between resolving the misfit through: 1) greater centralization of authority and a reduction of responsibility for managers, or 2) greater decentralization and an increase of authority for the managers.

Conclusion

We have not found an answer to our question of where problems come from, but we have begun a dialogue on the textual, rhetorical nature of organizations and organizational analysis. Our analysis suggests that language and metaphor are actively involved in the construction of the organizational features we take to be real, and the problems we take as simply given.

A method of information analysis that fails to critically scrutinize the metaphors that inform its analysis is vulnerable to relinquishing the choice of problems it addresses to the metaphors it happens to be using. Such metaphors as "the organization is a contract" or "information is a commodity" abound in our literature and our accepted as being neutral without sufficient critical reflection.

We do not see any end to the different organizational problems that could be brought into being through different metaphorical analyses. Nor do we hope for a meta-metaphor that could somehow resolve all the diverse possible readings of the organization as a text. We see no final statement of the problems in any absolutist sense. Instead, we see only a dialogue to be engaged in, a hermeneutic search to be joined, and an openness of inquiry to be hoped for.

Table 1

Name Some Plants or Animals

Grass, leopard, oak tree, cat, redwood, thornbush, ivy, flower, corn, oak, rabbit, bird, weed, horse, dog, sunflower, thorns, hogs, skunk, rosebush, fern, spider plant, pig, bear, tree, fish, deer, monkey, daisy, rice, sorghum, insects, snake, poison ivy, chicken, squirrel, moss, dolphin, tiger, cactus, pinetree, tomato, eagle, cow, possum, fox, lion, giraffe, mice, coyote

Name Some Characteristics of Plants and Animals

Leafy, cool, lazy, ugly, unique, cunning, fleet, scenic, farsighted, docile, large, shy, dumb, deceptive, ferocious, aggressive, sneaky, protective, powerful, moist, slow, flowering, seedy, thriving, quick, self-sufficient, sturdy, blooming, fruitful, strong, predatory, small, edible, spreading, vicious, growing, gentle, refined, reproduce, alive, flourish, agile, breathing, wasteful, dirty, obedient, durable, dangerous, mighty, fast, parasite, mean, pretty, annoying, fragrant, smelly, slimy, healthy, furry, wild, wilted, overgrown, flexible

Name Some Things That May Go Wrong With Plants and Animals

Pollution, trapped, runaway, be eaten, get loose, be captured, become extinct, uncontrolled growth, lose habitat, overpopulate, fire, old age, foul weather, wilt, get hunted, go lame, kill you, bite you, fight, be injured, fall, become sterile, break, mutate, get sick, disease, be attacked, get lost, starve, strangle, wither, go to seed, run out of water, hunger, death, burned, overcrowded, drought, erosion, be shot, damage ecosystem, drown, be deformed, choke, rot

Name Some Things That Can Improve or Correct Plants and Animals

Restrict development, limit hunting, clean environment, monitor, relocate, eliminate some, protection, immunization, cage, free, breed, leave alone, weed, clean, deworm, birth control, separate, take to vet, befriend, love, water, train, domesticate, leash, fence, stake up/prop up, kill, medicate, shelter, transplant, water, support, eliminate, control, seed, nourish, fertilize, mend, nurture, feed, bandage, confine, comfort, surgery, replant

Table 2

Name Some Machines

Car, lathe, car engine, typewriter, stereo, xerox machine, blender, washing machine, vibrator, steam shovel, printing press, food processor, conveyor belt, calculator, jackhammer, word processor, computer printer, lawn mower, trash compactor, radio, plow, milling machine, turbines, assembly line, sewing machine, telephone, punch press, fork lift, tractor, crane, bullard, compressor, extruder, drill press, dryer, T.V., computer, shredder, airplane, copier, backhoe, press, molder, bottler, assembler, bass drum pedal, bulldozer, chain saw, can opener, dishwasher, vacuum

Name Some Characteristic of Machines

Noisy, fast, pumping, accurate, cleanses, functional, integrating, automatic, modifiability, sleek, strong, durable, requires lubrication, uses a process, speed, expensive, inhuman, helps humans, hardworking, easy to use, manual, interlocking parts, hot, loud, powerful, repetitious, fast, large, precise, durable, innovative, heavy, metallic, mechanical, consistent, productive, cumbersome, interrelationships, efficient, multiprocessing, necessary, motorized, complex, cold, undependable, oily, movements, nuclear, modern, busy, complicated, quick, grinding, smashing, rotating, greasy, analyzing

Name Some Things That Can Go Wrong With Machines

Rust, break, quit, smoking, wear out, electrical short, deteriorate, age, get stuck, used wrong, malfunction, obsolete, run down, overheat, inefficient, too complex, out of fuel, blow a bearing, short circuit, stop moving, go haywire, collide, uncontrollable, sabotage, miscalculate, broken gear teeth, uneconomical, wrong data, too fast/too slow, out of adjustment, erosion, excess tension, out of balance, get dirty, flat tire, wrong design, lose pressure, manual problem, become inefficient, ineffective, misused, leak oil, fall apart, high cost to maintain, lose a part, lose power, jam up

Name Some Things That Can Improve or Correct Machines

Reprogram, simplify, clean it, use manual overdrive, work around it, buy new, analyze, repair, retrain, secure, install controls, redesign, compatibility check, train staff, refuel, patch, turn off, pray, unjam, maintain, buy/replace parts, replace batteries, kick, invent new machine, tighten parts, replace, rewire, read instruction book, call repair man, oil, take apart, remodel, free up gears, tune-up, solder, update, return it, cool it down

Exhibit 1

Mechanistic Instructions

You have recently been hired as a consultant with a regional management consulting firm located in Pittsburgh, Pennsylvania. You are now beginning a training program. During it you will learn the firm's framework of analysis and philosophy of consulting. Clients of the firm are aware of the way the firm analyzes problems. Clients hire the firm because its framework of analysis is consistent with their values.

The framework of analysis follows directly from the values and teachings of its founder, Mr. Mason. He often says that "in order to understand organizations properly you have to understand that they are just like factories: lots of different machines, all working together."

Throughout your training, images of machinery will be used to characterize your client's problems and to justify the solutions you recommend. Consultants in the firm use whatever machines they feel best characterizes a client's situation as a basis for their analysis and recommendations.

Organic Instructions

You have recently been hired as a consultant with a regional management consulting firm located in Santa Fe, New Mexico. You are now beginning a training program. During it you will learn the firm's framework of analysis and philosophy of consulting. Clients of the firm are aware of the way the firm analyzes problems. Clients hire the firm because its framework of analysis is consistent with their values.

The framework of analysis follows directly from the values and teachings of its founder, Mr. Mason. He often says that "in order to understand organizations properly, you have to understand that they are just like a forest: lots of different plants and animals, all living together."

During your training, images of plants and animals will be used to characterize your clients' problems and to justify the solutions you recommend. Consultants in the firm use whatever plants or animals they feel best characterize a client's situation as a basis for their analysis and recommendations.

Exhibit 2

Bingham Boatyards

Bingham Boatyards Inc. was established at the turn of the century by the grandfather of the current President, Jack Bingham (42). The company was incorporated in 1924 and control is still maintained by the Bingham family.

Founded originally in Boston to build and repair sea-going fishing vessels, the company's interests have grown and changed over the years.

The company has three basic operating divisions:

1. The Harbor Yard in Boston -- Manager: John Griffiths (59), builds and repairs fishing vessels.
2. The Boat Rental Division on Cape Cod -- Manager: Robert Edwards (46), rents small sail and power boats.
3. The Cape Cod Yard -- Manager: Frank Beaver (38); builds and repairs small sail and power boats.

In 1927 the Head Office was moved from Boston to Cambridge. Most administrative functions take place in this office (see organization chart below). Jack Bingham became President in early 1984, after the death of his father.

Since becoming President, Jack Bingham has realized that the way his father and grandfather managed might not be appropriate for the changing circumstances of the business. He felt the need to involve the executives much more in the planning and control of the business, whereas his father had effectively made all the major decisions and had dominated board meetings.

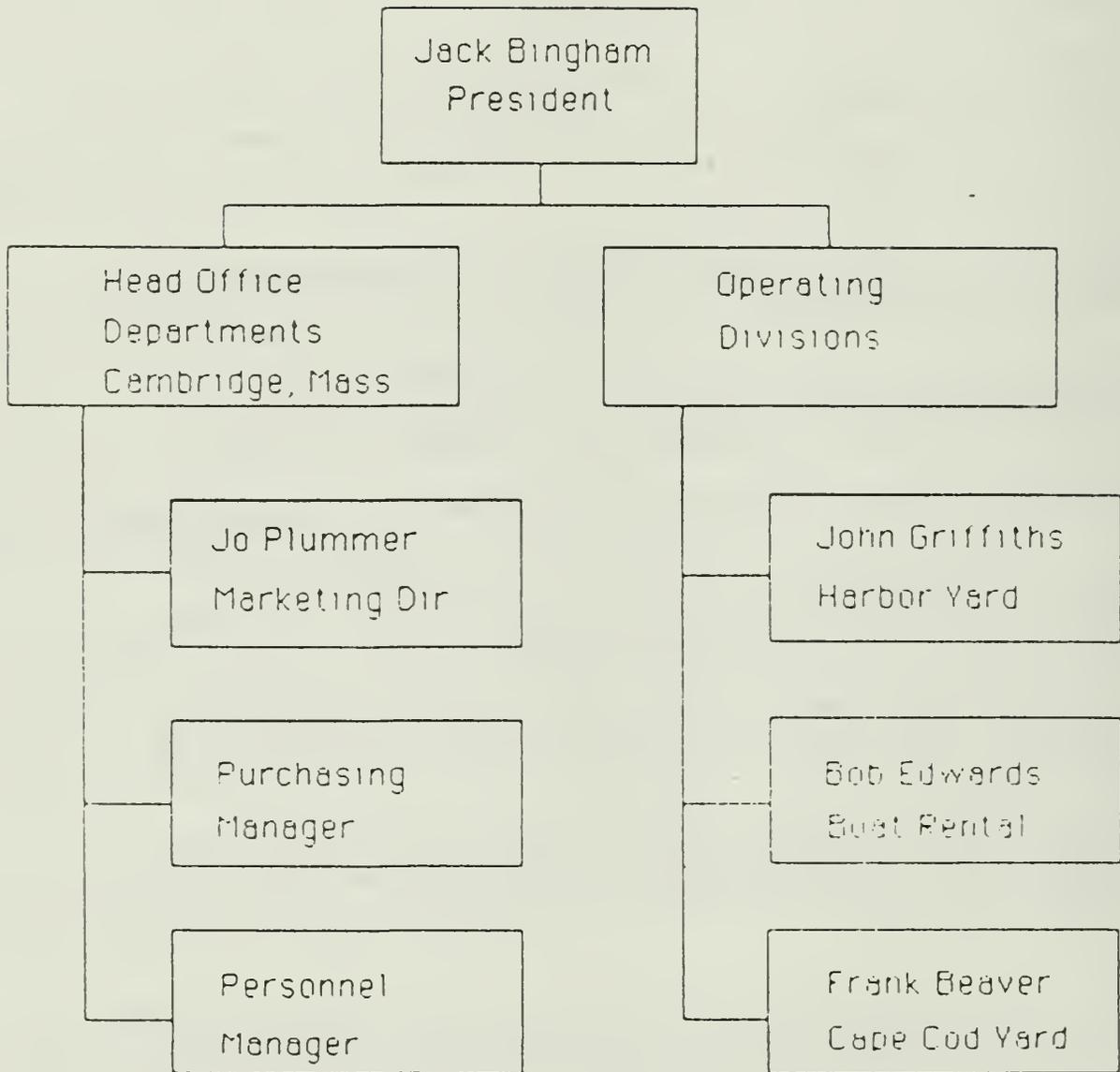
Soon after he became President, Jack Bingham employed consultants to introduce budgets and to define each senior manager's job. An attempt was also made to develop objectives for each manager, but some of the executives were uncommitted and uncooperative. Performance standards, in terms of sales revenues and profit, were determined for each division. The idea was to evaluate each division based on its own profit and loss statement. However, a number of problems had arisen. As a result, Jack Bingham wondered if the division's shouldn't be evaluated on some other basis.

John Griffiths was adamant that neither revenue nor profit was a meaningful measure when applied to the Harbor Yard. Since the Marketing and Estimating Department, under Jo Plummer, negotiated all contracts for boat building, how could he be responsible for profits? Griffiths also felt that the policy of the Marketing Director was tending to attract the wrong mix of orders for his production facilities. 'Anyone can increase revenues in the short run,' he said.

Bob Edwards believed that he was unnecessarily constrained by having to place orders for all his division's repair work and supplies with other divisions of the company. He was convinced that better prices and service could be obtained outside Bingham Yards. The company also insisted that all rental boats for hire were built in company yards.

After various discussions with individual managers, Jack Bingham called your consulting firm to consider what the real problems were and what alternatives he should consider.

Exhibit 2 (cont.)



Bingham Boatyards
Organization Chart

TABLE 3
 PROBLEM STATEMENT BY FRAME OF REFERENCE
 PROFESSIONALS

	Organistic (n=27)		Mechanistic (n=25)	
	Freq.	% of Sub.	Freq	% of Sun.
Change in leadership style	11	40.74%	4	16.0%
Change in organizational structure	0	0%	0	0%
Too much decentralization	0	0%	2	8.0%
Too much centralization	2	7.41%	2	8.0%
Lack of adaption to evolving internal needs	3	11.11%	3	12.0%
Resistance to change, fear, insecurity	7	25.93%	1	4.0%
Changing too fast, situation too complex	1	3.70%	1	4.0%
Lack of participation by managers in change	6	22.22%	6	24.0%
Operational efficiency	0	0%	4	16.0%
Inadequate lateral communication	0	0%	3	12.0%
Inadequate information system	0	0%	0	0%
Product lines, product management	0	0%	1	4.0%
Lack of interaction with environment	0	0%	0	0%
Not buying from outside	3	11.11%	3	12.0%
Lack of adaption to changing environment	4	14.81%	1	4.0%
Conflict over functions and responsibilities among managers, lack of cooperation, agency problem	12	44.44%	11	44.0%
Lack of innovative, talented, motivated managers	0	0%	2	8.0%
Inappropriate performance measurement/transfer pricing	19	70.37%	19	76.0%
Lack of clear, shared goals and inadequate planning	8	29.63%	7	28.0%
Constraints to growth from internal dynamics	9	33.33%	1	4.0%
Lack of managerial power	5	18.52%	1	4.0%
Lack of coordinated effort	1	3.70%	12	48.0%

TABLE 4
SOLUTION SUGGESTED BY FRAME OF REFERENCE
PROFESSIONALS

	Organistic (n=27)		Mechanistic (n=25)	
	Freq.	% of Sub.	Freq.	% of Sub.
Unspecified change in organizational structure	0	0%	1	4.0%
Decentralize	12	44.4%	6	24.0%
Centralize	2	7.4%	7	28.0%
Slow down rate of change	2	7.4%	1	4.0%
Create participative process	10	37.0%	9	36.0%
Convince managers that Bingham is right	1	3.7%	1	4.0%
Invest in new equipment, cost reduction studies	0	0%	0	0%
Create lateral interaction/integration across departments	8	29.6%	4	16.0%
Divest weak units, develop new lines	1	3.7%	2	8.0%
Improve interaction with and understanding of environment	6	22.2%	0	0%
Buy from outside	2	7.4%	8	16.0%
Improve executive confidence and pride	6	22.2%	3	12.0%
Executives do not cooperate, replace them	1	3.7%	3	12.0%
Provide managers with training programs, hire consultants or additional managers	0	0%	3	12.0%
Develop appropriate performance measure/reward system for each unit	18	66.7%	16	64.0%
Define objectives, goals, and lines of authority	9	33.3%	10	40.0%
Remove constraints to growth, give room to grow	0	0%	0	0%

TABLE 5
PROBLEM STATEMENT BY FRAME OF REFERENCE
STUDENT

	Organistic (n=23)		Mechanistic (n=19)	
	Freq.	% of Sub.	Freq	% of Sun.
Change in leadership style	0	0%	0	0%
Change in organizational structure	3	13.0%	1	5.3%
Too much decentralization	1	4.3%	11	57.9%
Too much centralization	7	30.4%	2	10.5%
Lack of adaption to evolving internal needs	5	21.7%	1	5.3%
Resistance to change, fear, insecurity	10	43.5%	9	47.4%
Changing too fast, situation too complex	0	0%	5	26.3%
Lack of participation by managers in change	2	8.7%	4	21.1%
Operational efficiency	3	13.0%	5	26.3%
Inadequate lateral communication	4	17.4%	2	10.5%
Inadequate information system	1	4.3%	2	10.5%
Product lines, product management	0	0%	2	10.5%
Lack of interaction with environment	7	30.4%	0	0%
Not buying from outside	2	8.7%	2	10.5%
Lack of adaption to changing environment	10	43.5%	1	5.3%
Conflict over functions and responsibilities among managers, lack of cooperation, agency problem	11	47.8%	6	31.6%
Lack of innovative, talented, motivated managers	3	13.0%	4	21.1%
Inappropriate performance measurement/transfer pricing	1	4.3%	3	15.8%
Lack of clear, shared goals and inadequate planning	4	17.4%	6	31.6%
Constraints to growth from internal dynamics	9	39.1%	0	0%
Lack of managerial power	0	0%	0	0%
Lack of coordinated effort	0	0%	0	0%

TABLE 6
SOLUTION SUGGESTED BY FRAME OF REFERENCE
STUDENT

	Organistic (n=23)		Mechanistic (n=19)	
	<u>Freq.</u>	<u>% of Sub.</u>	<u>Freq.</u>	<u>% of Sub.</u>
Unspecified change in organizational structure	5	21.7%	3	15.8%
Decentralize	7	30.4%	4	21.1%
Centralize	1	4.3%	6	31.6%
Slow down rate of change	0	0%	3	15.8%
Create participative process	10	43.5%	5	26.3%
Convince managers that Bingham is right	1	4.3%	2	10.5%
Invest in new equipment, cost reduction studies	1	4.3%	1	5.3%
Create lateral interaction/integration across departments	12	52.2%	4	21.1%
Divest weak units, develop new lines	5	21.7%	1	5.3%
Improve interaction with and understanding of environment	6	26.1%	1	5.3%
Buy from outside	6	26.1%	1	5.3%
Improve executive confidence and pride	10	43.5%	4	21.1%
Executives do not cooperate, replace them	5	21.7%	3	15.8%
Provide managers with training programs, hire consultants or additional managers	5	21.7%	3	15.8%
Develop appropriate performance measure/reward system for each unit	5	21.7%	2	10.5%
Define objectives, goals, and lines of authority	11	47.8%	8	42.1%
Remove constraints to growth, give room to grow	5	21.7%	0	0%

TABLE 7
 PROBLEM STATEMENT BY FRAME OF REFERENCE
 PROFESSIONALS AND STUDENTS

	Organistic (n=50)		Mechanistic (n=44)	
	Freq.	% of Sub.	Freq	% of Sun.
Change in leadership style	11	22.0%	4	9.1%
Change in organizational structure	3	6.0%	1	2.3%
Too much decentralization	1	2.0%	13	29.5%
Too much centralization	9	18.0%	4	9.1%
Lack of adaption to evolving internal needs	8	16.0%	4	9.1%
Resistance to change, fear, insecurity	17	34.0%	10	22.7%
Changing too fast, situation too complex	1	2.0%	6	13.6%
Lack of participation by managers in change	8	16.0%	10	22.7%
Operational efficiency	3	6.0%	9	20.5%
Inadequate lateral communication	4	8.0%	5	11.4%
Inadequate information system	1	2.0%	2	4.5%
Product lines, product management	0	0%	3	6.8%
Lack of interaction with environment	7	14.0%	0	0%
Not buying from outside	5	10.0%	5	11.4%
Lack of adaption to changing environment	14	28.0%	2	4.5%
Conflict over functions and responsibilities among managers, lack of cooperation, agency problem	23	46.0%	17	38.6%
Lack of innovative, talented, motivated managers	3	6.0%	6	13.6%
Inappropriate performance measurement/transfer pricing	20	40.0%	22	50.0%
Lack of clear, shared goals and inadequate planning	12	24.0%	13	29.5%
Constraints to growth from internal dynamics	18	36.0%	1	2.3%
Lack of managerial power	5	10.0%	1	2.3%
Lack of coordinated effort	1	2.0%	12	27.3%

TABLE 8
SOLUTION SUGGESTED BY FRAME OF REFERENCE
PROFESSIONALS AND STUDENTS

	<u>Organistic</u> (n=50)		<u>Mechanistic</u> (n=44)	
	<u>Freq.</u>	<u>% of Sub.</u>	<u>Freq.</u>	<u>% of Sub.</u>
Unspecified change in organizational structure	5	10.0%	4	9.1%
Decentralize	19	38.0%	10	22.7%
Centralize	3	6.0%	13	29.5%
Slow down rate of change	2	4.0%	4	9.1%
Create participative process	20	40.0%	14	31.8%
Convince managers that Bingham is right	2	4.0%	3	6.8%
Invest in new equipment, cost reduction studies	1	2.0%	1	2.3%
Create lateral interaction/integration across departments	20	40.0%	8	18.2%
Divest weak units, develop new lines	6	12.0%	3	6.8%
Improve interaction with and understanding of environment	12	24.0%	1	2.3%
Buy from outside	8	16.0%	9	20.5%
Improve executive confidence and pride	16	32.0%	7	15.9%
Executives do not cooperate, replace them	6	12.0%	6	13.6%
Provide managers with training programs, hire consultants or additional managers	5	10.0%	6	13.6%
Develop appropriate performance measure/reward system for each unit	23	46.0%	18	40.9%
Define objectives, goals, and lines of authority	20	40.0%	18	40.9%
Remove constraints to growth, give room to grow	5	10.0%	0	0%

TABLE 9
 SCORES ON QUALITATIVE MEASURES
 PROFESSIONALS

	<u>ORGANIZATION AND ITS ENVIRONMENT</u>		<u>TIME</u>		<u>PARTICIPATION</u>		<u>PERFORMANCE MEASUREMENT SYSTEM</u>	
	<u>ORG</u>	<u>MECH</u>	<u>ORG</u>	<u>MECH</u>	<u>ORG</u>	<u>MECH</u>	<u>ORG</u>	<u>MECH</u>
+3	3	1	5	9	8	4	1	15
+2	4	0	3	3	8	4	2	3
+1	4	1	2	0	4	5	2	4
0	0	0	0	0	1	4	2	0
-1	1	2	3	7	4	2	7	2
-2	5	1	5	5	1	2	7	1
-3	10	20	9	1	1	4	6	0
AVG	-.7	-2.4	-.63	.52	1.3	.2	-1.1	2.04

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