

Problem-Solving Adequacy in Hospital Subunits¹

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The problem-solving framework developed by Georgopoulos and his associates was used in the present investigation to explore the relationships among problem-solving adequacy, the appropriateness of organizational structures, and effectiveness in 52 subunits of a large, general hospital. Evidence obtained from interviews with subunit managers or directors, interviews with hospital executives, and aggregated responses of unit members are used to explore these relationships. Following most closely from Georgopoulos and Cooke's (1979) version of the problem-solving framework, hypotheses were derived from the following two propositions: (1) organizational subunits are problem-facing open systems that must solve a set of generic problems to be effective and (2) organizational structures are problem-solving mechanisms. Drawing from this theoretical perspective, it was hypothesized that subunit structural appro-

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priateness would be positively related to problem-solving adequacy and to effectiveness. Subunit problem-solving adequacy was also hypothesized to be positively related to effectiveness. Further, it was hypothesized that problem-solving adequacy would mediate the relationship between structural appropriateness and subunit effectiveness. The results provide support for all of these hypotheses, although the positive relationship between structural adequacy and effectiveness receives only limited confirmation.

INTRODUCTION

Organizations have long been viewed as problem-solving entities. As early as 1953, Parsons, Bales, and Shils (1953) considered organizations to be mechanisms for solving various functional problems such as adaptation and goal attainment. In addition, Simon and his associates (Cyert & March, 1963; March & Simon, 1958; Simon, 1957) viewed organizations as problem-facing and problem-solving systems from a cognitive perspective. Thompson (1967) also described organizations as problem-solving social aggregates, most notably in his discussion of the coordination problem.

This perspective has been developed most completely in theory and research on hospitals and their subunits by Georgopoulos and his colleagues (Georgopoulos, 1970, 1972; Georgopoulos & Cooke, 1979; Georgopoulos, Cooke, & Associates, 1980; Georgopoulos & Matejko, 1967). This problem-solving framework was used in the present study of hospital subunit effectiveness. Specifically, this study draws heavily on the version of the problem-solving framework developed by Georgopoulos and Cooke (1979) for the description of hospital emergency services. Building on Georgopoulos' earlier work, they emphasize that all organizational systems face a set of generic problems, that all organizations and their subunits rely on their structures to solve these problems, and that system effectiveness depends on the ability to generate prompt and proper solutions to generic problems as they arise. Georgopoulos and Cooke's framework has been empirically tested in a study of 30 hospital emergency services (Georgopoulos, Cooke and Associates, 1980) and was modified for use in a study of 25 public schools by Cooke and Rousseau, 1981). Hence, the present study of hospital subunits is complementary to, and an extension of, these two other inquiries. Stemming from this theoretical framework, the purpose of the present investigation was to explore the relationships among structural appropriateness, problem-solving adequacy, and effectiveness in a sample of 52 hospital subunits.

THEORETICAL FRAMEWORK

The Problem-Solving Perspective

In one of the earliest statements of the organizational problem-solving perspective, Parsons et al. (1953) contended that every organization is confronted with a set of four functional problems. These problems were labeled “system problems” by Bales (1953) and were characterized as universal exigencies for all forms of social systems. The four functional problems discussed by Parsons, Bales, and Shils were summarized by Etzioni (1975) as follows:

- (1) *Adaptation*—the system’s need to control the environment.
- (2) *Goal attainment*—the gratification of the system’s goals.
- (3) *Integration*—the maintenance of solidarity among the system’s units.
- (4) *Latency or tension management*—the reinforcement of the integrity of the value system and its institutionalization.

Georgopoulos and Matejko (1967) expanded and refined the set of generic system problems developed by Parsons et al. This set of problems was developed further in subsequent works by Georgopoulos (1972) and Georgopoulos and Cooke (1979). The set of problems used by Georgopoulos and Cooke was modified for the present investigation. The system problems examined in this study were coordination, adaptation, external maintenance, resource acquisition, resource allocation, integration, strain amelioration, and goal attainment. Each is defined below.

Coordination. March and Simon (1958) define this as “the problem of arranging the signalling system for interdependent conditional activities” (p. 28). Hence, the coordination problem is one of articulating the activities of organization members in time and space (Georgopoulos, 1972; Georgopoulos & Mann, 1962).

Adaptation. This is the problem of responding to changes in the environment by bringing about or allowing changes within the organization itself (Georgopoulos, 1972; Georgopoulos & Tannenbaum, 1957). As open systems, organizations and their subunits must adopt new structures and technologies and modify existing ones on a continuing basis in order to survive and flourish.

External maintenance. Georgopoulos and Cooke define maintenance as the ability of the system to maintain its basic character in the face of both internal and environmental changes. We focused on external maintenance in this investigation. This is the problem of preserving the organization’s identity and integrity in the face of environmental changes that threaten the stability of the system (Ford & Sutton, 1980). External maintenance is necessary in order to ensure that the system receives adequate inputs and that it is not subject to excessive intrusion from outside groups. External maintenance is distinguished from adaptation by the focus of action. Adaptation implies internal organizational changes in response to environmental

demands. External maintenance implies actions by the organization that are intended to change the task environment.

Resource acquisition. This is the problem of obtaining adequate energy inputs for the system. Examples of energy inputs include raw materials, capital, personnel, and information. Resources such as these are acquired through energy exchanges with the environment. Organizational survival depends on the maintenance of a positive balance of energy inputs, or negentropy (Katz & Kahn, 1978). In other words, the total energy inputs must exceed the total energy outputs.

Resource allocation. This is the problem of distributing available resources in an appropriate manner. Organizations and their subunits must not only acquire resources; they must allocate physical space, money, information, materials, personnel, and rewards equitably and efficiently (Georgopoulos & Matejko, 1967).

Integration. This is the problem of binding members to the organizational system. The problem of integration has been solved when most members feel as if they are an important part of the organization, have internalized the system's goal and are willing to expend considerable effort for the organization (Katz & Kahn, 1978; Schwarz, 1980). This concept of integration is more narrow than that described by Georgopoulos and Cooke. Their concept includes both the integration of members and organizational structures.

Strain amelioration. The problem of strain amelioration is one of minimizing the inevitable tensions and conflicts that arise within organizations (Georgopoulos & Matejko, 1967). Those organizational units that are able to quickly reduce or eliminate interpersonal strains or conflicts as they arise are said to be solving the problem of strain amelioration.

Goal attainment. Goal attainment or "enjoyment of the goal state" (Parsons, 1953) is the problem of reaching and maintaining high levels of output (Georgopoulos, 1972). Goal attainment occurs when an organizational system has accomplished its formal, stated, or actual task or mission.

Organizational effectiveness depends on the discovery of appropriate solutions to this set of universal problems. Hence, organizational problem-solving mechanisms are an integral part of the framework used in the present investigation. We propose that these mechanisms include organizational structures.

Organization Structure and Problem Solving

Georgopoulos and his colleagues also asserted that organization structures are bases for solving generic system problems. This theoretical stance was described most explicitly by Georgopoulos and Cooke: "the role structure, normative structure, authority structure, communication structure, etc.—constitute the basic problem-solving framework of the system. Structures make it possible for the system . . . to deal with problems faced by the system" (1979; p. 9).

Following from this theoretical approach, we propose that hospital subunits rely on their structures to solve system problems and that the

problem-solving capacity of a hospital, or one of its subunits, depends on the appropriateness of its structures. For example, the normative structure of a hospital is an important mechanism for socializing members and thus solving the problem of integration. The words and actions of other organization members provide the new member with information about how he or she is expected to behave. Moreover, the norms must be appropriate in order to socialize new members; they must promote psychological attachment to the system rather than psychological withdrawal.

Performance programs are another example. March and Simon's (1958) discussion of organization structures focused on performance programs, which are written or unwritten plans or scripts that specify organizational activities for situations that arise with regularity. They contended that organizations use programs to help solve the problem of coordination and that the programs must be appropriate for the type of coordination required by each system. To illustrate, the members of a surgical intensive care unit must be prepared to execute a wide range of complicated medical procedures at a moments notice. As a result, solving the coordination problem in such units requires performance programs that specify detailed courses of action for all unit members in a wide variety of recurring situations. In contrast, programs that specify detailed courses of action may not be appropriate for solving the coordination problem in an administrative unit. As Mintzberg (1973) has shown, managerial work does not lend itself to precisely specified, preprogrammed activities.

Problem Solving and Organizational Effectiveness

A wide variety of organizational theorists have defined organizational effectiveness as a multifaceted concept (e.g., Cameron, 1978; Georgopoulos & Tannenbaum, 1957; Goodman, Pennings, and Associates, 1977; Katz & Kahn, 1978). These theorists generally contend that there are too many possible organizational processes and outcomes for any single effectiveness indicator to serve well. This multifaceted perspective is reflected in the problem-solving framework. Building on the work of Georgopoulos and his associates (Georgopoulos, 1970; 1972; Georgopoulos & Cooke, 1979; Georgopoulos & Matejko, 1967), overall system effectiveness was viewed as a function of how well a hospital subunit was able to solve each of the following generic problems: coordination, adaptation, external maintenance, resource acquisition, resource allocation, integration, strain amelioration, and goal attainment. Each of these problems must be solved on an ongoing basis to ensure that the system will continue to survive and, beyond that, to flourish. Thus, an effective social

system is one that acts to ensure long-term survival and growth without depleting the resources and legitimacy it obtains from the environment. This definition is derived from theory and research using the natural systems model of organizational effectiveness (e.g., Argyris, 1964; Katz & Kahn, 1978; Yuchtman & Seashore, 1967). However, it is generally not possible to measure long-term survival and growth in research on organizations; it is simply too costly and time consuming (Aldrich & Pfeffer, 1976; Pfeffer, 1977). As a result, researchers are generally forced to rely on surrogate measures to help them estimate the probability that a system will survive and grow over time.

Hypotheses

The purpose of this study was to explore relationships among structural appropriateness, problem-solving adequacy, and effectiveness in a sample of hospital subunits. Drawing from the theoretical perspective described above, we contend that all hospital subunits must solve a set of generic system problems, that the adequacy of problem-solving depends on the appropriateness of subunit structures, and that subunit effectiveness depends on how well the system is able to solve a set of generic problems. Thus, we contend that structural appropriateness leads to problem-solving, which in turn leads to subunit effectiveness. While this causal model cannot be tested completely with cross-sectional survey data, evidence about the framework can be obtained by exploring the relationships among these variables. As a result, this theoretical perspective gave rise to the following four hypotheses:

Hypothesis 1: Structural appropriateness will be positively related to problem-solving adequacy.

Hypothesis 2: Structural appropriateness will be positively related to overall subunit effectiveness.

Hypothesis 3: Problem-solving adequacy will be positively related to overall subunit effectiveness.

Hypothesis 4: The relationship between structural appropriateness and subunit effectiveness will be mediated by problem-solving adequacy.

METHOD

Hospital Subunits

A sample of 52 hospital subunits participated in this study. All 52 subunits were from a large, short-stay hospital in the midwest. This sample

included a wide range of nursing and non-nursing subunits including surgical intensive care, personnel, emergency services, organization development, radiology, food service, medical intensive care, security services, and surgery. Subunit size ranged from 4 full-time equivalents to 173, with a mean of 41.

Subunit Members

The members of each subunit were used as observers of subunit effectiveness. A random sample of 25% of the employees in each of the 52 subunits was drawn. Questionnaires were distributed to all types of personnel at every level of the participating subunits, including staff nurse, escort, pharmacist, engineer, head nurse, respiratory therapist, secretary, licensed practical nurse, security officer, and business manager. Of the 518 questionnaires distributed, 361 were returned for an overall response rate of 70%.

Procedures

The procedures used in this study entailed interviewing the head of each subunit, distributing questionnaires to all randomly selected employees, and interviewing hospital executives. A detailed structural interview was administered to the subunit head in 49 of the 52 subunits. The interview was given to another high-ranking supervisor or manager in the remaining three subunits. This interview was used to measure subunit attributes including problem-solving adequacy, structural appropriateness, and effectiveness.

As mentioned above, 25% of the employees in each subunit were randomly selected to complete a questionnaire. The instrument included items on a variety of topics including job characteristics, job satisfaction, nonwork activities, and subunit effectiveness. However, only the questions about overall subunit effectiveness were used in this study.

In addition, two high-ranking hospital executives completed a brief structured interview designed to measure the effectiveness of the 52 participating subunits from the hospital administration's perspective.

INSTRUMENTS

Subunit Problem-Solving Adequacy

The subunit head interview was used to measure problem-solving adequacy. The scales used to measure problem-solving are coordination,

technical adaptation, hospital adaptation, external maintenance, resource acquisition, resource allocation, integration, strain amelioration, and goal attainment. All of these variables were measured with 5-point Likert-type response options. Table I includes internal consistency reliabilities computed with Cronbach's alpha for each scale. The items that constitute these scales are presented in the Appendix.

Coordination is the problem of articulating interdependent activities in space and time. The 4-item coordination scale was based on a set of questions formulated by Georgopoulos and Mann (1962). Adaptation is the problem of responding appropriately to relevant changes in the subunit's task environment. Two aspects of the adaptation problem were examined, technical adaptation and hospital adaptation. Technical adaptation is the problem of keeping up with relevant changes and innovations in the task environment (Cooke, 1979). Hospital adaptation is the problem of satisfying the needs and demands of the parent hospital. Technical and hospital adaptation were measured with separate 4-item scales developed for this study.

External maintenance is the problem of maintaining the subunit's basic character in the face of environmental changes and demands. A 5-item scale was developed to measure external maintenance. Resource acquisition is the problem of obtaining adequate energetic inputs. It was measured with a 7-item scale. Some of the items were based on a resource acquisition scale developed by Georgopoulos, Cooke and Associates (1980). Resource allocation is the problem of distributing available resources appropriately. Drawing on questions used in research on schools (Coughlan & Cooke, 1974), a 7-item resource allocation scale was developed for the present investigation.

Integration is the problem of binding members to the system. The six items included in the integration scale were borrowed from, or based on, a variety of sources, including a study of hospital emergency services (Georgopoulos, Cooke and Associates, 1980) and research on schools (Coughlan & Cooke, 1974; Schwarz, 1980).

Strain amelioration is the problem of minimizing the inevitable tensions and conflicts that arise within organizations. This 3-item scale was based on a scale developed by Georgopoulos, Cooke and Associates (1980). The final problem examined was goal attainment, the problem of reaching and maintaining high levels of output. A 5-item goal attainment scale was developed by the researchers for this study.

Subunit Structural Appropriateness

An appropriate structure helps the subunits and its members solve the set of problems described above. Stated differently, it increases the

Table I. Internal Consistency Reliabilities

Scale	Cronbach's alpha
Authority structure appropriateness	.82
Normative structure appropriateness	.68
Role distribution appropriateness	.57
Performance program appropriateness	.71
Coordination	.67
Technical adaptation	.62
Hospital adaptation	.69
External maintenance	.56
Resource acquisition	.80
Resource allocation	.80
Integration	.76
Strain amelioration	.62
Goal attainment	.65
Subunit effectiveness-subunit head perspective	.52
Subunit effectiveness-hospital perspective	.81
Subunit effectiveness-member perspective	.90

problem-solving capacity of the system (Georgopoulos, 1972). Structural appropriateness was measured with four scales placed on the subunit head interview. These are: authority structure, normative structure, role distribution, and performance program appropriateness.

The approach we used to assess the problem-solving capacity of organizational structures was first used in the study of hospital emergency services (Georgopoulos, Cooke and Associates, 1980). Following from this approach, an appropriate structure was operationalized here as one that simultaneously maximized various criteria of rationality. In the measures of authority structure, normative structure, and role distribution appropriateness these criteria were clinical efficiency (providing high quality service), economic efficiency (providing service at the lowest possible cost), and social efficiency (maintaining a high level of job satisfaction). In the fourth measure, performance program appropriateness, the criteria were clinical efficiency, economic efficiency, and time efficiency (providing service as promptly as possible). Each of these scales was composed of three items and was measured with 5-point Likert-type response options. These items are presented in the appendix. In addition, internal consistency reliabilities for each scale are presented in Table I.

While this approach was adopted from the study of emergency services, the scales used for measuring authority structure appropriateness were all developed for this study. The authority structure is the manner in which unit members in various positions are linked by decision-making power. In order to assess the authority structure, subunit heads were asked

how appropriate the distribution of authority was within the unit with respect to the three criteria of rationality described above.

Norms are expectations that are shared by all, or nearly all, of the members of a social system (Katz & Kahn, 1978). Norms about work performance were examined in this study. Thus, normative structure appropriateness was operationalized as the extent to which expectations shared among unit members about work standards maximized the three criteria of rationality.

The role structure is the way in which expected behaviors are allocated to individuals in various positions and the nature of the interconnections among the positions (Katz & Kahn, 1978). Both role distribution and performance program appropriateness are indicators of the problem-solving capacity of the role structure. Role distribution appropriateness is the extent to which the allocation of activities among various positions enhances the problem-solving capacity of the system. It was operationalized as the degree to which the division of labor within the unit increased the three criteria of rationality.

March and Simon (1958) defined performance programs, or simply programs, as "situations in which a relatively simple stimulus sets off an elaborate program of activity without any apparent interval for search problem solving, or choice" (p. 143). Hence, programs are viewed here as sets of role expectations or behavioral guidelines for recurring situations and are defined as part of the role structure.

Performance program appropriateness was assessed with a three-item scale developed for measuring the quality of procedures used in hospital emergency services (Georgopoulos, Cooke and Associates, 1980). It is not possible to obtain usable data by asking respondents to describe the appropriateness of their behavioral guidelines for recurring situations. Procedures are a useful surrogate for performance programs because they are written and unwritten guidelines that specify employee actions in recurring circumstances.

Overall Subunit Effectiveness

If subunit effectiveness depends on problem-solving adequacy, then it is necessary to measure effectiveness as well as problem-solving adequacy to obtain evidence about the problem-solving framework. We define an effective subunit as one that has a high probability of long-term survival and growth and a low probability of depleting the resources and legitimacy it receives from the environment. However, survival and growth cannot be measured directly in a cross-sectional study; they must be inferred from other data sources. Thus, we used knowledgeable informants

as observers of subunit effectiveness Rating of overall effectiveness for each subunit were obtained from the subunit head interview, questionnaire responses of subunit members, and the brief interview with hospital executives. These ratings were combined into three different effectiveness scales developed for this study. These are: subunit effectiveness-subunit head perspective (3 items), subunit effectiveness-member perspective (13 items), and subunit perspective-hospital perspective (4 items). These scales were measured with 5- and 7-point Likert-type response options. All effectiveness items are presented in the Appendix. In addition, internal consistency reliabilities computed with Cronbach's alpha are presented in Table I.

Subunit effectiveness-member perspective was derived from aggregate data. This variable was aggregated from individual questionnaire responses to form a mean effectiveness score for each subunit. Evidence about whether or not an aggregate variable measures something at the system level is indicated by the ratio of between-group to within-group variance (Georgopoulos & Tannenbaum, 1957; Prezeworski & Teune, 1970). An ANOVA was performed using individual perceptions of subunit effectiveness as the dependent variable and hospital subunits as the independent variable. The between-group variance is significantly greater than the within-group variance ($F = 1.5$; $df = 51,305$; $p \leq .05$). This suggests that the aggregated variable does measure a system-level phenomenon.

ANALYSIS AND RESULTS

The product-moment correlations among all variables are presented in Table II. The multiple regression analysis presented in Tables III-VI were used to test the four hypotheses. The findings relevant to each hypothesis are discussed in turn.

Hypothesis 1: Structural appropriateness will be positively related to problem-solving adequacy.

The results obtained by regressing the nine problem-solving variables on the set of four structural appropriateness variables are presented in Table III. These findings provide support for Hypothesis 1; seven of the nine regressions resulted in significant ($p \leq .05$) squared multiple regression coefficients (R^2). Only resource acquisition and technical adaptation were not significantly related to structural appropriateness.

An examination of the significant beta weights provides information about the contribution of individual structure variables. Authority structure

Table II. Correlations of All Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Authority structure	.24															
2. Normative structure	.64 ^a	.27														
3. Role distribution	.57 ^a	.32 ^a	.61 ^a													
4. Performance programs	.58 ^a	.36 ^a	.47 ^a	.61 ^a												
5. Coordination	.46 ^a	.14	.31 ^a	.42 ^a	.51 ^a											
6. External maintenance	.14	.23	.29 ^a	.29 ^a	.31 ^a	.34 ^a										
7. Technical adaptation	-.07	.35 ^a	-.06	.35 ^a	.32 ^a	.24	.47 ^a									
8. Hospital adaptation	.19	.33 ^a	.12	.32 ^a	.27 ^a	.57 ^a	.18	.15								
9. Resource acquisition	.29 ^a	.18	.49 ^a	.46 ^a	.53 ^a	.51 ^a	.43 ^a	.28 ^a	.35 ^a							
10. Resource allocation	.34 ^a	.55 ^a	.35 ^a	.40 ^a	.55 ^a	.32 ^a	.33 ^a	.24	.14	.32 ^a						
11. Integration	.40 ^a	.16	.38 ^a	.40 ^a	.54 ^a	.39 ^a	-.01	.16	.20	.39 ^a	.50 ^a					
12. Strain amelioration	.39 ^a	.42 ^a	.49 ^a	.63 ^a	.63 ^a	.40 ^a	.57 ^a	.51 ^a	.17	.40 ^a	.48 ^a	.42 ^a				
13. Goal attainment																
14. Subunit effectiveness																
-subunit head perspective	.54 ^a	.23	.49 ^a	.60 ^a	.73 ^a	.53 ^a	.51 ^a	.31 ^a	.24	.53 ^a	.53 ^a	.46 ^a	.64 ^a			
15. Subunit effectiveness																
-hospital perspective	.07	.04	-.07	.17	.16	.10	.21	.38 ^a	.16	.10	-.01	-.01	.15	.16		
16. Subunit effectiveness																
-member perspective	-.06	.26	-.06	.23	.12	.28 ^a	.10	.24	.07	.28 ^a	.07	-.04	.26	.02	.31 ^a	

p < .05.

Table III. Multiple Regression of Problem-Solving Adequacy on Structural Adequacy

Structural adequacy	Coordination ^a		External maintenance ^b		Technical adaptation ^c		Hospital adaptation ^d		Resource acquisition ^e		Resource allocation ^f		Integrations ^g		Strain amelioration ^h		Goal attainment ⁱ	
	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t
Authority structure	.35	2.49 ^j	.35	2.07 ^j	.16	.87	.24	1.42	.08	.42	.11	.65	.10	.65	.20	1.11	-.05	-.29
Normative structure	.17	1.50	-.00	-.03	.14	.95	.02	.11	.27	1.88	.02	.14	.46	3.75 ^j	.01	.08	.23	2.01 ^j
Role distribution	-.02	-1.0	-.07	-.37	.25	1.28	-.27	-1.54	-.17	-.94	.40	2.35 ^j	.08	.48	.10	.84	.16	1.02
Performance programs	.37	2.63 ^j	.27	1.60 ^j	.19	1.03	.67	3.99 ^j	.30	1.65	.28	1.72	-.14	-.88	.22	1.23	.48	3.34 ^j
R ²		.49 ^j		.26 ^j		.14		.27 ^j		.18		.31 ^j		.37 ^j		.20 ^j		.46 ^j

^aF = 10.85 (4, 46) *p* < .01.

^bF = 3.98 (4, 46) *p* < .01.

^cF = 1.84 (4, 47) ns.

^dF = 4.18 (4, 46) *p* < .01.

^eF = 2.46 (4, 46) ns.

^fF = 5.07 (4, 46) *p* < .01.

^gF = 6.74 (4, 46) *p* < .01.

^hF = 2.81 (4, 46) *p* < .05.

ⁱF = 9.93 (4, 47) *p* < .01.

^j*p* < .05.

and performance program appropriateness both predicted positively to coordination and external maintenance. Role distribution appropriateness predicted positively to resource allocation, performance program appropriateness predicted positively to hospital adaptation, and normative structure appropriateness predicted positively to goal attainment. These individual beta weights support Hypothesis 1; all of the significant weights indicated a positive relationship between structural appropriateness and problem-solving adequacy.

The product-moment correlations presented in Table II also provide support for this hypothesis. Of 36 correlations between problem solving and structural appropriateness presented in this table, 27 were significant ($p \leq .05$) and all significant correlations were positive.

Hypothesis 2: Structural appropriateness will be positively related to overall subunit effectiveness.

The results obtained by regressing the three measures of overall effectiveness on the set of structural appropriateness variables are presented in Table IV. These findings provide limited support for Hypothesis 2. Of the three effectiveness indicators, only subunit effectiveness-subunit head perspective had a significant R^2 ($p \leq .05$). An examination of the beta weights indicates that performance program appropriateness was significantly and positively related to the subunit heads' effectiveness ratings. Hence, Hypothesis 2 does receive limited support; the set of structural appropriateness variables was positively related to effectiveness in one of three instances. A similar pattern was found among the 12 correlations between structural appropriateness and effectiveness presented in Table II; the three significant correlations were positive.

Hypothesis 3: Problem-solving adequacy will be positively related to overall subunit effectiveness.

The results obtained by regressing the three subunit effectiveness variables on the set of problem-solving adequacy variables are presented in Table V. These findings support Hypothesis 3; two of the three effectiveness measures, subunit head perspective and member perspective, had significant squared multiple correlations (R^2). The third R^2 , effectiveness-hospital perspective, was not significant. However, hospital adaptation did predict positively to effectiveness-hospital perspective. This significant beta weight within an overall nonsignificant regression may be due to the low correlations all other problem-solving variables had with this effectiveness measure.

In addition, all significant beta weights predicted positively to the effectiveness indicators. This provides further support for Hypothesis 3.

Table IV. Multiple Regression of Subunit Effectiveness Indicators on Structural Adequacy

Structural adequacy	Subunit effectiveness indicators					
	Subunit effectiveness-subunit head perspective ^a		Subunit effectiveness-hospital perspective ^b		Subunit effectiveness-member perspective ^c	
	Beta	<i>t</i>	Beta	<i>t</i>	Beta	<i>t</i>
Authority structure	.25	1.65	.19	.88	-.23	-1.22
Normative structure	.02	.17	.04	.26	.21	1.42
Role distribution	.08	.50	.43	1.90	-.12	-.60
Performance programs	.41	2.75 ^d	.36	1.80	.36	1.87
<i>R</i> ²		.43 ^d		.10		.15

^aF = 8.70 (4, 47) *p* < .01.

^bF = 1.25 (4, 43) n.s.

^cF = 1.83 (4, 42) n.s.

^d*p* ≤ .05.

Moreover, of the 27 correlations between problem solving and effectiveness presented in Table II, 11 are significant and positive.

Hypothesis 4: The relationship between structural appropriateness and subunit effectiveness will be mediated by problem-solving adequacy

If problem-solving does mediate the relationship between structural appropriateness and effectiveness, then, when problem solving is held constant, the relationship between structural appropriateness and effectiveness should disappear. Partialling problem-solving out of the effectiveness measures has the effect of holding problem-solving constant. The results of the regressions of the residual effectiveness scores on measures of structural appropriateness are presented in Table VI. The findings support Hypothesis 4. All regressions and individual beta weights were nonsignificant. Further, all three *R*²'s were vastly reduced, to nearly zero. Thus, a comparison of the findings presented in Tables IV and VI supports Hypothesis 4.

DISCUSSION

The findings from this study generally support the problem-solving framework presented above. Subunit structural appropriateness was positively related to problem-solving and to system effectiveness, although the latter relationship received only limited support. In addition, problem-solving adequacy was positively related to system effectiveness and

Table V. Multiple Regression of Subunit Effectiveness Indicators on Problem-Solving Adequacy

Problem-solving adequacy	Subunit effectiveness indicators					
	Subunit effectiveness-subunit head perspective ^a		Subunit effectiveness-hospital perspective ^b		Subunit effectiveness-member perspective ^c	
	Beta	t	Beta	t	Beta	t
Coordination	.43	3.08 ^d	.21	.86	.14	.71
Technical adaptation	.29	2.16 ^d	.10	.46	.12	.64
Hospital adaptation	.08	.77	.38	2.14 ^d	.15	.97
External maintenance	.16	1.22	.13	.56	.71	3.79 ^d
Resource acquisition	.05	.48	.12	.67	.36	2.21 ^d
Resource allocation	.02	.17	.01	.05	.20	1.13
Integration	.05	.43	.15	.77	.05	.30
Strain amelioration	.12	.89	.04	.19	-.19	-.97
Goal attainment	.13	.86	-.10	-.41	.33	1.62
R^2		.66 ^d		.19		.39 ^d

^a $F = 8.88 (9, 41) p < .01.$

^b $F = .97 (9, 37) ns.$

^c $F = 2.59 (9, 37) p < .05.$

^d $p < .05.$

Table VI. Multiple Regression of Residualized Subunit Effectiveness Variables on Structural Adequacy

	Effectiveness Indicators					
	Subunit effectiveness-subunit head perspective ^a		Subunit effectiveness-hospital perspective ^b		Subunit effectiveness-member perspective ^c	
	Beta	<i>t</i>	Beta	<i>t</i>	Beta	<i>t</i>
Structural adequacy						
Authority structure	.07	.37	.19	.99	.03	-.17
Normative structure	.22	1.18	-.02	-.10	-.03	-.17
Role distribution	.05	.26	.20	.84	.14	.69
Performance programs	.22	1.47	.02	.11	.13	.64
<i>R</i> ²		.07		.02		.02

^a *F* = .92 (4, 46) n.s.

^b *F* = .26 (4, 42) n.s.

^c *F* = .18 (4, 41) n.s.

problem solving appears to mediate the structure-system effectiveness relationship.

These results are consistent with the study of hospital emergency services (Georgopoulos, Cooke and Associates, 1980) and the study of public schools (Cooke & Rousseau, 1981). Both studies found that the appropriateness of organizational structures was positively related to organizational problem-solving and to various indicators of effectiveness. In addition, these two investigations also obtained evidence that problem-solving mediates the relationship between the appropriateness of organizational structures and effectiveness. Taken together, the results of these two other studies and the present investigation provide support for the problem-solving framework developed by Georgopoulos and Cooke; the results of all three studies suggest that this framework may be a useful one for describing organizational systems.

The magnitude of the relationship found between structural appropriateness and problem-solving adequacy supports the proposition that organizations rely on their structures to solve problems. The set of structural appropriateness variables predicted 49% of the variance in coordination, 26% in external maintenance, 31% in resource allocation, 27% in hospital adaptation, 37% in integration, 20% of the variance in strain amelioration, and 46% of the variance in goal attainment. However, the existence of positive relationships between structural appropriateness and problem-solving adequacy is necessary but not sufficient evidence that organizations rely on their structures to solve problems. More rigorous tests

would include the use of experimental designs and causal modeling techniques. However, experimental designs, quasiexperimental designs, and causal modeling techniques all demand greater specification of hypotheses than now exists. Therefore, in order for this framework, or one like it, to remain useful and interesting, it will be necessary to specify relationships among the variables in this framework more precisely.

To illustrate, future investigations should focus on specifying the process by which organizations use structures to solve problems. March and Simon (1958) suggested that structure allows organization members to have fairly complete knowledge about a limited set of cause-effect relationships. They proposed that performance programs (part of the organization's structure) help members to solve problems with a minimum amount of search behavior and that structure is a mechanism for creating spheres in which organization members can achieve bounded rationality, which also aids the problem-solving processes by reducing uncertainty. Although these propositions may have high face validity, we are not aware of any empirical investigations in which they have been tested directly. While the results of this study suggest that these explanations are feasible, further research is needed to assess their validity. Moreover, alternative explanations for the underlying mechanisms in the relationships among structures and problems must be proposed and tested. For example, does structure increase knowledge of cause-effect relationships or does it only reduce the possible range of outcomes without any effect on knowledge held by members? Perhaps structures are the outcomes of problem-solving activities or perhaps the causal relationships among structures and problems are reciprocal.

The results of this study also support the hypothesis that problem-solving adequacy is positively related to overall subunit effectiveness. The set of problem-solving variables predicted 66% of the variance in subunit effectiveness-subunit head perspective and 39% in subunit effectiveness-member perspective. In addition, while the set of problem-solving variables did not predict subunit effectiveness-hospital perspective, the problem of hospital adaptation had a substantial relationship ($r = .38$) with this set of effectiveness ratings. However, an effective subunit was defined as one that acts to ensure long-term survival and growth without depleting the resources and legitimacy it receives from the environment. Thus, while these relationships are substantial, they should be interpreted with caution because surrogate measures of effectiveness were used. Longitudinal studies are required in order to obtain the evidence needed for a complete test of these relationships.

CONCLUSION

The problem-solving framework appears to be a promising one for studying organizational systems. The findings from this study support the two major propositions derived from this framework: (1) organizational subunits are problem-facing open systems that must solve a set of generic problems to be effective and (2) organizational structures are problem-solving mechanisms. However, although we have evidence of certain relationships, we have no evidence concerning the underlying causal mechanisms for those relationships. Thus, the theoretical specification of the model must be increased dramatically, new evidence must be obtained through a variety of research methodologies, and the components of causality must be decomposed using causal modeling techniques.

APPENDIX. MEASURES OF THE VARIABLES

I. Subunit Head Interview

Five-point Likert-type response scales were used to measure all of the variables in the structured interview.

A. Authority Structure Appropriateness

Please think of the amount of authority held by people in various positions in your unit. On the whole, how appropriate is this distribution of authority from the standpoint of:

- (i) providing service of the highest quality possible?
- (ii) maintaining a high level of job satisfaction among members of the unit?
- (iii) providing service at the lowest possible cost?

B. Normative Structure Appropriateness

Please think about the work standards held by members of this unit. More specifically, think about the standards concerning what is acceptable and unacceptable work. How appropriate are these standards from the perspective of:

- (i) providing service of the highest quality possible?
- (ii) maintaining a high level of job satisfaction among members of the unit?
- (iii) providing service at the lowest possible cost?

C. Role Distribution Appropriateness

Please think about the way that work is divided up among the various people in this unit. How appropriate is this division of labor from the standpoint of:

- (i) providing service of the highest quality possible?
- (ii) maintaining a high level of job satisfaction among members of the unit?
- (iii) providing service at the lowest possible cost?

D. Performance Program Appropriateness

Please think of the various procedures used by this unit. To what extent are most of them appropriate from the standpoint of enabling the staff to provide the highest quality service?

To what extent are these procedures appropriate from the standpoint of enabling the staff to provide service at the lowest cost possible?

To what extent are these procedures appropriate from the standpoint of enabling the staff to provide service as promptly as possible?

E. Coordination

People in this unit use work time efficiently by planning and coordinating their efforts.

The people who work in this unit take into account each other's work as they go about doing their own.

To what extent do people in this unit do their jobs properly without getting in each other's way?

To what extent are related activities well timed in the everyday routine of this unit?

F. Technical Adaptation

This unit has all the latest machines and other equipment it needs to provide the best possible service.

This unit is doing all that it should to train its members in the latest work methods and techniques.

When we decide to use new procedures or equipment in this unit, it usually results in an improvement in the service we provide.

To what extent is this unit keeping up with relevant technical changes and innovations?

G. Hospital Adaptation

To what extent has this unit been responsive to changes in the needs of the hospital?

This unit does an excellent job of responding to the needs of the larger hospital.

In general, the quality of the service provided by this unit meets or exceeds the expectations of the hospital administration.

The hospital administration is very satisfied with the performance of this unit.

H. External Maintenance

If the hospital administration makes unreasonable demands on this unit, we can usually convince them to change their demands.

The people who use the produce or service provided by this unit have too great an impact on the way this unit operates.¹

This unit is able to influence decisions made by the hospital administration so that they are favorable to the unit.

The work this unit must do is hindered by unreasonable demands from the hospital administration.³

To what extent can this unit influence the hospital to make changes in policies or procedures?

I. Resource Acquisition

This unit is able to acquire the physical space it needs to do its work.

If this unit could operate more smoothly with more space, it would be able to acquire that space.

This unit is able to obtain the money and equipment it needs to continue to provide adequate service.

If this unit's needs for services from other units in the hospital were to increase, this unit could obtain them.

If this unit needed more money and equipment to maintain an adequate level of service, it could obtain them.

If this unit could improve service with more money and equipment, it could obtain them.

To what extent is this unit able to obtain the services it needs from other units in the hospital?

J. Resource Allocation

People in this unit are paid fairly based on their work load.

The layout of this unit is inconvenient for the staff.³

³This variable was reverse coded.

In general, the people in this unit are paid fairly.

Considering the different qualifications held by members in this unit, pay is administered fairly among them.

People in this unit have the equipment they need to do their jobs.

The physical layout of this unit interferes with the work we do.

In general, to what extent do people have adequate supplies for doing their jobs?³

K. Integration

The people here are willing to give a lot of effort in order to meet the basic requirements of their jobs.

The people here are willing to give a lot of effort to do even more than their jobs require.

The people in this unit are willing to give a lot of effort to develop better work methods.

The goals and objectives of the individual members of this unit are consistent with the goals and objectives of the unit as a whole.

Most of the employees in this unit feel as if they are an important part of the unit.

To what extent is the quality of the service provided by this unit important to the people who work here?

L. Strain Amelioration

Disagreements among people in this unit rarely lead to continuing bad feelings.

There is little tension among the various people who work in this unit.

When disagreements arise about problems facing this unit, these disagreements are usually worked out to everyone's satisfaction.

M. Goal Attainment

This unit as a whole is capable of reaching its goals and objectives.

This unit is effective at getting the things done it is supposed to do.

To what extent is this unit capable of doing the job or jobs it is supposed to do?

To what extent does this unit do the job or jobs it is supposed to do?

To what extent does this unit provide the highest quality service at the lowest possible cost?

N. Subunit Effectiveness-Subunit Head Perspective

This unit is effective at coping with unexpected problems.

In general, to what extent is this unit effective?

To what extent is this unit effective at running smoothly with a minimum of confusion?

II. Hospital Executive Interview

Five-point Likert-type response scales were used to measure all of the variables in the structured interview.

A. Subunit Effectiveness-Hospital Perspective

In comparison to all other hospital units, how effective is each of the following units at adapting to the needs and demands of the hospital as a whole?

Compared to other units in the hospital, what kind of reputation does each of the following units have as a good place to work?

In comparison to all other hospital units, how effective is each of the following units at keeping up with relevant technical changes and innovations?

In comparison to all other hospital units, how effective is each of the following units overall?

III. Subunit Member Questionnaire

Five-point Likert-type response scales were used to measure all questionnaire items.

A. Subunit Effectiveness-Member Perspective

How effective is your supervisor at:

- (a) making things run smoothly?
- (b) helping you get things done on the job?
- (c) arranging things so that you enjoy your work?
- (d) coping with unexpected problems?

How effective are you at:

- (a) getting things done on the job?
- (b) helping you get things done on the job?
- (c) arranging for work to go as smoothly as possible?
- (d) coping with unexpected problems?

How effective is your unit as a whole at:

- (a) getting the things done it is supposed to do?
- (b) running smoothly with a minimum of confusion?
- (c) helping people who work there get their jobs done?
- (d) coping with unexpected problems?

How effective would you say your unit is overall?

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BIOGRAPHICAL NOTES

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