A theoretical explication and empirical examination of a general systems model of organizational effectiveness

Paula Christine Morrow
Iowa State University

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by

Paula Christine Morrow

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Chapter I presents (1) an orientation to the research problem; (2) a discussion of the research problem; (3) research objectives; (4) contributions of the dissertation to sociological inquiry; and (5) the dissertation outline. ¹

Orientation to the Research Problem

From an historical point of view, a general systems approach to scientific inquiry is a recent development. Nearly all scientific advancements have occurred within particularistic disciplines; e.g., mathematics, physics, economics. The general systems approach to science, however, has already resulted in the generation of new ideas which may ultimately surpass the utility of intradisciplinary contributions. One such contribution is the recognition of a qualitative difference between living and nonliving systems (van Gigch, 1974:47). Boulding (1956) is credited with the formalization of this distinction and, along with von Bertalanffy (1950), is identified with the formation of General Systems Theory (GST). GST was devised as an alternative to conceptual schemes associated with the traditional analytical-mechanistic approaches of the physical sciences (e.g., the laws of physics). It was generally recognized that these conventional approaches were not adequately explaining "the properties of systems in the biological, behavioral, and

¹This research was approved by the University Human Subjects Review Committee, Iowa State University.
sociological fields" (van Gigch, 1974:47). Among the shortcomings of these analytical-mechanistic approaches was the inability to handle the open nature of living systems. The open designation refers to the fact that living systems exist within an environment. More specifically, it is sensitive to the idea that living systems relate, exchange, and communicate with other systems. The GST approach, at present, is not a theory in terms of a set of logically interrelated propositions; however, efforts at formal theory construction are now beginning to appear (Miller, 1972; Kuhn, 1974). Berrien (1968) and Ball (1978) have suggested that the approach be used as a strategy for inquiry. In summary, GST provides an integrated conceptual structure for conducting scientific inquiry that seeks to be interdisciplinary in scope. It purports to embrace both living and nonliving things. This thesis will draw upon elements of GST which deal with open, living systems of social organization.

Recent writings by general systems theorists indicate that adherence to the GST perspective now requires that one accept an additional assumption. Miller (1972:2) states that general systems theorists must subscribe to the idea that "there are important formal identities of large generality across levels." By this Miller means that certain characteristics of systems are applicable in all units of analysis. Although Miller's contention may ultimately be confirmed by research, there is presently little empirical evidence to support such a comprehensive assumption. Accordingly, while this dissertation will attempt to follow general principles of the GST orientation, it will not necessarily adopt the latter assumption concerning generalizability in all units (systems)
of analysis. Instead, it will assume that a general systems framework is useful because (1) the notion of system is potentially applicable to many kinds of things and (2) generalizations developed from observing one kind of system are often discovered to be valid for other, sometimes discrepant, kinds of systems (Kuhn, 1974:20).

While the general systems perspective is a fairly new approach, the adoption of a "systems" perspective in sociological research is not a new idea. Systems related conceptualizations have been evident in the works of such respected scholars as Parsons (1951) and Homans (1950). These works, like most, have met with various criticisms and have stimulated others to suggest improvements. Buckley (1967), for example, contends that the general ("modern") systems framework can overcome the major criticisms of the Parsonian model (e.g., an overemphasis on stability, reaffirmation of the status quo, and cooperation, coupled with a neglect of deviance and change). Certain substantive areas within sociology have found a "systems" perspective useful in constructing explanations of social phenomena, particularly the area of complex organizations. Most of this work, while recognizing the importance of the environment and other extraorganizational factors, has been based on single organizations and has frequently focused on decision-making within closed system models (Rice and Bishoprick, 1971:175). Thus it would seem that while the "systems" perspective has demonstrated at least some utility within sociology, it has also encountered some rather serious problems.

The general systems approach, with its reputed ability to handle
open living systems, seems to be the next logical point of inquiry. In order to differentiate between the general and the older systems approaches, the general systems approach is often referred to as the modern or open systems approach. It promises to incorporate various advantages of systems thinking (see van Gigch, 1974:49) while resolving many of the problems observed in closed systems models. It is now appropriate for the general or open systems approach to begin to receive critical attention and evaluation. Hopefully, this dissertation will contribute to such an effort.

Statement of the Problem

There has been a relative lack of empirical studies using the general systems perspective. However this perspective enjoys high prestige among social scientists at present, particularly among those engaged in organizational research. As Kast and Rosenzweig (1972:447) note, the appeal of an approach which purports to unify all of science under one grand conceptual framework is hard to resist. Nevertheless, the empirical evidence to support GST within organizational research is negligible (though increasing—see for example Hage, 1974 and Nightingale and Toulouse, 1977). In this dissertation, open purposive systems are selected for examination. The general systems approach is especially suitable to the proposed research because, according to Georgopoulos (1973:102), organizational units are:

complex, dynamic, and adaptive systems which are in constant interchange with their environment. They are always subject to external forces, pressures, and stimuli that have significant consequences for behavior within the system and vice
versa, for organizations are more or less open systems.

Hence, the general objective of this dissertation is to conduct an empirical study of open systems using a general systems perspective.

An initial problem in the application of the general systems orientation to a particular system (i.e., unit of analysis) is the identification and selection of appropriate systems concepts. Recent taxonomic work by Ackoff (1971) and Kuhn (1974) has reduced the level of ambiguity and synonymity associated with systems concepts but the task is still not easy. Accordingly, one aim of this dissertation will be to identify, explicate, operationalize and empirically examine general systems concepts suitable to the units under investigation. The most fundamental notions of the general systems perspective that are useful in the study of open systems have been identified as the environment, inputs, throughputs, and outputs (see Katz and Kahn, 1966; van Gigch, 1974; and Kuhn, 1974). These notions are termed constructs rather than concepts to indicate that the concepts selected to represent each notion may not exhaust its theoretical domain. In addition, some systems concepts which holistically describe system level properties are proposed; vertical suprasystem feedback, horizontal suprasystem feedback, negentropy, and dynamic homeostasis. Rationales for these proposed concepts are discussed in Chapter II. The development of these new concepts is justified on the basis that most systems scholars recognize and contend that the general systems perspective is still in its incomplete, formative stages and by the theoretical groundwork established by Katz and Kahn (1966) in their delineation of open systems characteristics. The theoretical and
empirical examination of these holistic system properties constitutes another research objective.

Beyond these developmental aspects of the research problem, some other, more substantive, research questions have also been formulated. System output effectiveness has been identified as a construct of interest because of its numerous parallels with organizational effectiveness and because of its applied importance. Though Georgopoulos' (1973) and Evan's (1976) conceptual frameworks are somewhat different from the one which will be developed here, both researchers have explicitly identified organizational effectiveness as a concept which might benefit from consideration within an open (general) systems framework. Of particular interest is the assessment of (a) the relationship between each of the construct categories (i.e., environmental factors, system inputs, system throughputs, holistic system properties) and system output effectiveness and (b) the relationship between each of the proposed system properties and system output effectiveness. The evaluation of these relationships will be contingent on the acquisition of valid and reliable measures of concepts and is assumed to be a theory building, as opposed to a theory testing, effort. Hypothesis statements, however, will be used as a research guide.

Research Objectives

The general, overall objective of this dissertation is to design and conduct an empirical study of open systems using a general systems perspective. To facilitate the achievement of this objective, several
more manageable and specific objectives are identified:

(1) To theoretically identify and explicate general systems constructs and concepts applicable to open systems.

(2) To develop measures of general systems concepts applicable to open systems.

(3) To theoretically and empirically develop system output effectiveness and organizational effectiveness by relating these two constructs to each other within a general systems perspective and by examining the interrelationships among the variable measures of their component concepts.

(4) To theoretically and empirically identify some holistic properties of open systems.

(5) To theoretically and empirically examine the relationships between each construct category (i.e., environment, inputs, throughputs, system properties) and dimensions of system output effectiveness.

(6) To theoretically and empirically examine the relationship between each of the concepts representing a construct category and dimensions of system output effectiveness.

Contributions to Sociological Inquiry

This research effort is thought to make several contributions to sociological inquiry. The first is identified as greater theoretical and empirical specification of the general systems approach to the study of complex organizations. Constructs and concepts commonly used in
general systems analyses are identified and explicated in a manner consistent with current knowledge about complex organizations. In addition, several concepts which holistically describe open systems are introduced and empirically examined. Taken together, these concepts are held to be representative of a new open systems construct, termed system properties. The system properties construct is considered analogous to other open systems constructs such as inputs or throughputs. Finally, efforts are made to describe some of the empirical relationships among the open systems constructs and concepts in conjunction with a theoretically derived model of system output effectiveness. More specifically, this analysis examines the consequences of various levels of open system constructs and concepts for system output effectiveness.

The theoretical and empirical examination of system output effectiveness can be viewed as another contribution of this study. Shifting levels of abstraction is an often recommended but underutilized strategy for the advancement of social science. In this study, system output effectiveness is treated as a more general or abstract form of organizational effectiveness. As such, organizational effectiveness is defined as a multidimensional construct whose component dimensions are determined by criteria used in the evaluation of open systems. It is anticipated that the deductive application of the open systems perspective may be able to circumvent some of the conceptual and methodological problems endemic to the study of organizational effectiveness.
Dissertation Outline

The theoretical orientation of this dissertation will be elaborated in Chapter II, with particular attention rendered to the past affinity observed between GST and organizational research. Open systems constructs and concepts will be discussed at systemic and organizational levels. Relationships among the constructs and concepts will be posited within a theoretical model and research hypotheses will be derived. The chapter will conclude with a discussion of open systems models and appropriate forms of empirical analysis.

Chapter III will focus on the methods of data analysis used in the research. The sample, data sources, and data collection procedures will be described. The variable measures, analysis strategy and statistical procedures will also be presented.

In Chapter IV, the findings will be described, including evaluation of the hypotheses. Chapter V will stress the theoretical implications of the research findings, note the limitations of the study, and offer suggestions for future research.
CHAPTER II. THEORETICAL ORIENTATION

Modern organization theory leads, as it has been shown, almost inevitably into a discussion of general system theory. . . . Organization theorists in administrative science cannot afford to overlook the contributions of general system theory. Indeed, modern organization concepts could offer a great deal to those working with general system theory. But the ideas dealt with in the general theory are exceedingly elusive. (Scott, 1961:22)

As this quotation from Scott suggests, general systems theory has often been proposed as a potential framework for the advancement of organizational research. However, as Scott also observes, the explication and application of GST principles has been somewhat problematic given the elusiveness of the perspective. In this chapter, a rationale for the use of GST in organizational research is developed and illustrated by the construction of a conceptual model of organizational sub-units in an open systems framework. The various assumptions underlying the explication of GST to this organizational analysis are also reviewed. In addition to these efforts, this chapter introduces the open systems constructs used to describe the organizational subunits, identifies the concepts representative of each construct, and develops general hypotheses consistent with the theory-building orientation of the research. The final section of this chapter elaborates on the analysis techniques suitable to open systems thinking.
In the introductory chapter of this thesis it was observed that a "systems" orientation to sociological inquiry is not a new idea. This is true in organizational research as well. One of the earliest organizational scholars, Barnard (1938), defined an organization as a particular type of system. The renowned Hawthorne studies (see Roethlisberger and Dickson, 1939) are credited with the incorporation of Pareto's (1965) conception of a social system into organizational research. These early treatments of organizations-as-systems were based on an image of organizations as closed or self-contained systems. The closed system view of organizations inspired research seeking to explain how organizational arrangements and decisions influence organizational goal achievement. There are several major variants within the closed system school. The Weberian perspective, for example, emphasizes the structural aspects of organizations and the efficient and rational linking of means to ends. Another closed system variant is represented by the human relations school in which interpersonal processes and social conditions within the organization are stressed. More recently, organizational theorists have come to appreciate organizations as holistic systems worthy of study in their own right rather than merely settings for examination of intraorganizational processes (March and Simon, 1958; Haire, 1959). In addition, this shift in thinking has directed researchers to consider factors external to the organization. There is growing consensus among organizational researchers that organizations are most profitably viewed as open systems (see Katz and Kahn, 1966; Thompson,
1967; Scott, 1969, 1961; Kast and Rosenzweig, 1972; Georgopoulos, 1973; van Gigch, 1974; Kuhn, 1974; and Toronto, 1975). Viewing organizations holistically, as open systems which exist in and interact with an environment, constitutes the bridge between contemporary organizational research and GST.

Organizations as open systems

The study of complex organizations as systems is specifically recognized in nearly all taxonomic descriptions of GST (e.g., Boulding, 1956; Miller, 1965; Kuhn, 1974; van Gigch, 1974). GST adherents begin their explications with a definition of system, such as Ackoff's (1971: 662) "a set of interrelated elements", and then invoke various analytical criteria for subdividing their subject matter into qualitatively different units of analysis. Nearly all GST scholars make a primary distinction between open and closed systems (Miller, 1965; Kuhn, 1974; van Gigch, 1974; Monge, 1977). An open system is one that is influenced by and an influence on its environment. In a closed system, interactions occur only among components of the system. Kuhn (1974) and van Gigch (1974), however, do point out that even closed or nonliving systems can manifest some properties of open systems if provided with a feedback mechanism.

Complex (or formal) organizations are identified as open systems in all of the GST taxonomies. Specifically, organizations are viewed as open systems because they are dependent upon their external environments for survival; an organization can exist only by exchanging materials with its environment (cf. Buckley, 1967). Beyond the initial consensus
over the open-closed categorization, there is little agreement concerning the next most appropriate classification criteria. However, nearly all GST proponents come to recognize complex organizations as a unique type of system. Most view complex organizations as open systems engaged in purposeful, goal-oriented behavior (see Katz and Kahn, 1966; van Gigch, 1974; Kuhn, 1974). It is interesting to observe that the GST perspective on organizations is in fundamental agreement with the major defining criteria used by organizational scholars to identify the unit. By synthesizing the definitions of Etzioni (1964), Scott (1964), and Hall (1977), a complex (i.e., formal, large-scale, bureaucratic) organization can be defined as an intentionally created, goal-oriented collectivity with a relatively identifiable boundary separating the collectivity from its environment. The similarity between this definition of an organization and the perspective maintained by GST adherents serves to justify the application of GST to organizational research. In addition, van Gigch (1974) argues that the compatibility of GST and organizational inquiry is further enhanced because of the historical emphasis on systemic conceptualizations in organizational research and because the GST orientation complements, rather than opposes, previous schools of organizational theory.

Current impact of the GST orientation

The pervasiveness of open systems thinking in organizational research has been evident for quite some time. Scott (1961) was among the first to explicitly recognize the points of convergence while Katz and Kahn (1966) are credited with the codification of GST principles
relevant to organizational research. Other researchers (e.g., Emery and Trist, 1969; Rice, 1961; Miller and Rice, 1967) were conducting similar explications at about the same time but did not receive the same recognition as Katz and Kahn (1966). Numerous potential advantages of GST for organizational theorizing (and by extention, social science) have been noted. They include contentions that: (1) GST provides a general body of concepts and theory which serves to facilitate communication among organizational scientists working in different disciplines (Boulding, 1956; Bertrand, 1972); (2) that GST reveals "Gestalten" or holistic properties common in higher levels of social organization (Buckley, 1967; Emery, 1969; Bertrand, 1972); and (3) that GST has the capacity to deal with both the formal and informal aspects of organizational behavior (Brinkerhoff and Kunz, 1972). Others (Miller, 1965; Boulding, 1956) see GST as useful in generating new hunches, insights and hypotheses about organizations via the orderly, building-block nature of the orientation. Boulding (1956), for example, draws an analogy between GST and the periodic table of elements to argue how overriding frameworks can direct researchers to unrecognized knowledge gaps. The primary advantages of GST for organizational research, however, are those associated with the treatment of organizations as open systems. By adopting an open systems perspective, pitfalls endemic to the closed systems perspective are avoidable; e.g., failure to consider the external environment, the reciprocal relationship between organizations and their environments, equifinality, and the effects of feedback processes (Katz and Kahn, 1966; Bertrand, 1972).
The extent to which these advantages actually exist has not yet been determined. Similarly, the disadvantages and deficiencies of GST for organizational research have not been adequately evaluated. Common criticisms offered include a lack of specificity concerning what is meant by a system, difficulties in explicating and operationalizing systems ideas, and a lack of evidence to support the perspective's predictive ability (Phillips, 1969; Hage, 1974; Luthans and Stewart, 1977). The final assessment of GST is contingent upon empirical studies of organizations as open systems. Unfortunately, hardly any empirical studies of this nature have been conducted, despite the popularity of "open systems" as an organizing framework (Kast and Rosenzweig, 1972). As Hage (1972) has observed, there is really little consensus concerning what a systems analysis is or what steps one should follow to implement one. Perhaps the most commonly used idea to emerge from the application of GST to organizational research has been the conceptualization of an organization as a system engaged in input, throughput and output functions. This constitutes the starting point for the theoretical explication and empirical application of GST to the study of complex organizations developed here. Before proceeding to this task, however, a brief digression to relate the assumptions behind GST and this research is necessary.

Assumptions

In this section three sets of assumptions are examined: (1) assumptions underlying the GST perspective, (2) assumptions related to the conceptualization of organizations as open systems, and (3) assumptions
endemic to this particular research effort.

Assumptions underlying GST

General systems theory, like other sciences, is engaged in a systematic effort to discover law and order in the universe. Unlike other sciences, it extends this systematic search to include a search for an order of order and a law of laws (Schoderbek, 1971:5). Beyond this general objective of GST are other basic premises. Boulding (1964) has identified five of these fundamental assumptions which are summarized here:

(1) Order, regularity, and nonrandomness are preferable to a lack of order or randomness.

(2) Orderliness in the empirical world makes the world good, interesting and attractive. (Note that orderliness here means systematic and not the absence of conflict or a state of consensus.)

(3) There is order in the orderliness of the external or empirical world--a law about laws.

(4) To establish order, quantification and mathematization are highly valuable aids. However, GS theorists also recognize that there may be (and are) empirical elements displaying order that are not amenable to quantification and mathematization.

(5) The search for order and law necessarily involves the quest for the empirical referents of this order and law.

These assumptions should be interpreted as value judgments or statements that one accepts without further proof. This researcher accepts these assumptions without challenge and thus they may be said to underlie this dissertation. There are other, somewhat more debatable, hallmarks of the GST perspective. Rather than discuss these additional postulates in general or unit-free terms, they are presented in the next section as
assumptions related to the organization as an open system.

Organizations as purposeful, open systems

Viewing organizations as open systems suggests that organizations manifest attributes and processes common to all open systems. Silverman (1974) contends that there are three main assumptions underlying the view of organizations as open systems.

(1) Organizations (open systems) are composed of a set of interdependent parts (see also Katz and Kahn, 1966). This means that each part (subsystem) of an organization contributes to and receives something from the whole. Hage (1974) interprets this assumption to also mean that a change in one organizational variable will produce changes in other organizational variables, given enough time and a sufficiently large change.

(2) Organizations (open systems) are governed by a series of needs which they must satisfy in order to survive. While the specification of what constitutes a survival need has not and may never be agreed upon (see Selznick, 1948 and Merton, 1967), needs commonly recognized include the integration of organizational parts over time (dynamic homeostasis), the maintenance of a ratio of organizational inputs to organizational outputs that is greater than one (negentropy), and the processes of feedback (Schoderbek, 1971; Katz and Kahn, 1966; Bertrand, 1972). Katz and Kahn (1966) discuss these needs in considerable detail as characteristics or attributes of open systems. Dynamic homeostasis, negentropy, and feedback are assumed to be organizational needs for survival in this research but they are treated as variable processes rather than static attributes.

(3) Viewing organizations as open systems which act to satisfy their needs implies that organizations can engage in behavior that is not reducible to the acts of individual organizational members (i.e., system parts). An alternate way of stating this assumption is to assert that organizations are real and that organizations can act. Additional support for this assumption is provided by the present researcher's belief that (a) organizations can constrain (influence) individual behavior, (b) that organizations can affect change independently of individual acts, (c) that organizations manifest properties unrelated to the personal characteristics of their members and (d) because organizations have
the unique ability to exist beyond the life span of constituent members. Relevant discussions of these auxiliary assumptions can be found in Warriner (1958), Lazarsfeld and Menzel (1961), Thompson (1967), and Hall (1977).

In addition to these three assumptions consolidated by Silverman (1974) are two more underlying premises:

1. Organizations (open systems) are complex wholes made up of smaller subsystems. At the same time, however, any given organization can be conceptualized as a subsystem existing within a larger suprasystem (Kuhn, 1974; van Gigch, 1974; Berrien, 1968; Toronto, 1975; Hage, 1974). Differentiating among systems, suprasystems and subsystems is purely an analytical procedure; i.e., whatever distinctions are instituted depends on the researcher's point of view (Katz and Kahn, 1966). However, the rendering of these distinctions is important in an open systems framework as the "supersystem sets the limit of variance of behavior of the dependent system" (Katz and Kahn, 1966:58). This nesting of systems is sometimes referred to as a hierarchy (Schoderbek, 1971).

2. The last assumption relevant to viewing organizations as open systems is the contention that organizations can reach the same final state or produce the same outcome from several different starting points (von Bertalanffy, 1950; Miller, 1965; Katz and Kahn, 1966; Schoderbek, 1971; Hage, 1974; Kuhn, 1974). This ability is known as the principle of equifinality.

Assumptions of the research

There are at least three remaining assumptions to be reviewed. The first, which has already been discussed, is the equating of organizations and open systems (see pp. 11-13). The second, related assumption is that theory and research pertaining to organizations can be extended to describe organizational subunits. This assumption merits further elaboration.

While researchers frequently contend that it is useful to distinguish among levels of organizational analysis, they seldom suggest criteria
for making such distinctions. The organizational subunit designation is used to refer to a production function implemented by one individual, a work group, an aggregate of work groups physically or functionally divided, and a branch (district) office arrangement where constituent branches are geographically separated. One is hard pressed to determine when these units become more appropriately viewed as independent, organization-like entities. Hannan and Freeman (1977), for example, note that organizational subunits often develop their own goals. Yet, a goal-orientation is one of the criteria often used to empirically distinguish organizations from other units of analysis. The issue for this research emerges as whether the organizational subunits are best conceptualized as systems (i.e., organizations) or organizational subsystems. In this study, the organizational subunits of interest correspond most closely to the branch office typification. These subunits specify their own goals and manifest pooled, rather than serial or reciprocal, interdependence (cf. Thompson, 1967). In addition, each subunit independently transacts with its environment to gain inputs, process them, and export outputs. The presence of these characteristics suggests that the units under investigation are comparable to organizations. Accordingly, it was decided that the organizational subunits to be studied in this research effort exhibited sufficient similarity with organizations to justify the use of theory and research intended for organizations.

A final assumption underlying this research is that individuals can be used as units of data collection in the study of more macroscopic units of analysis (Lazarsfeld and Menzel, 1961). In this study, various
individuals holding intraorganizational and extraorganizational positions are consulted for their perceptions and assessments of the focal organizational units. These individuals are assumed capable of providing valid information about organizational properties. A related issue concerns the number of individuals used to describe a macroscopic unit or represent a particular point of view. It is assumed here that the top decision-maker within an organizational unit can provide valid assessments and information pertaining to his unit and that an elected representative of the community can validly represent community opinion. These assumptions are necessary because when only one person is asked to describe or represent a unit comprised of more than one person, that singular report cannot readily be evaluated for reliability or validity. This set of assumptions is not regarded as problematic for several reasons. Price (1972) and Weirath (1976) both observe that it is frequently necessary to depend upon individual member responses for information about the nature of an organization. Price (1972:4) further legitimizes the practice by stating that "the reason for the reliance on this type of data is that the best organizational research uses this method". The use of a single respondent or informant also has considerable precedent in both community and organizational research. Seidler (1974) discusses the role of informants in organizational inquiry and reviews several studies which have relied on single informants (e.g., Blau, 1968). In addition, Aiken and Hage (1968), Turk (1977), and Schmidt and Kochan (1977) argue that individual decision-makers are legitimate data sources because their perceptions and behavior are important in determining
future organizational and community policies. Thus, although there are drawbacks to this technique (e.g., no means of establishing that consensus exists, potential informant error), the single informant approach provides an economical way of obtaining information about a large number of units at a relatively low cost.

This concludes the discussion of assumptions made in this research. In the following section, a conceptual model of organizations is developed based on these assumptions and other aspects of open systems thinking.

Conceptual Model of Organizations

The image of organizations presented thus far has stressed that organizations are open systems; i.e., system which have environments and manifest feedback processes relative to those environmental elements (van Gigch, 1974; Bertrand, 1972). Viewing organizations in this manner has encouraged the application of the energetic input-output model to organizational research (Katz and Kahn, 1966). This model (see Figure 2.1) suggests that organizations can be understood by analytically separating the organization from its environment and then identifying input, throughput, and output factors. Inputs are important because organizations must obtain energy from the external environment; throughputs are necessary to understand the activities of the organizational system and how work is accomplished; and outputs are required because they provide the means of obtaining new inputs (i.e., systems must make some form of payment to the environment for the resources they use—see Miller and Rice, 1967). In short, this model tries to take into account
Dashed lines represent the analytical separation of the system (organization) from the environment.

Figure 2.1. Input-throughput-output model
the idea that "organizations are affected by what comes into them in the form of input, by what transpires inside the organization, and by the nature of the environmental acceptance of the organization and its output" (Hall, 1977:58).

Not surprisingly, this model has been used extensively in organizational research as an organizing framework (e.g., Rice, 1961; Miller and Rice, 1967; Mulford and Klonglan, 1972; Hage, 1974; Bidwell and Kasarda, 1975; Evan, 1976; Pennings and Goodman, 1977; Katz and Kahn, 1966; and Steers, 1977, among many others). Hall and Clark (1975:112) note that "the concepts of input, throughput, and output have become part of the standardized language of organizational analysts" while Georgopoulos (1974) contends that in order to understand a complex organization, one must employ an input-transformation-output research model (emphasis added). Frequently, however, the model is used haphazardly or only as a legitimizing technique for attempting to predict various outputs from a knowledge of various inputs. Kast and Rosenzweig (1972) call these studies "partial systems approaches" and observe that most attempts to apply GST to organizations are incomplete. This researcher concurs with the Kast and Rosenzweig assessment and suggests that one neglected component of the open systems model is the state of the system. System states refer to general characteristics or properties which describe an entire system and are discussed in the following section as a desirable addition to the open systems model of organizations.
Expanded Conceptual Model of Organizations

The previous description of the input-throughput-output model of organizations has inferred that this model is deficient in some respects (i.e., reflects an incomplete explication of GST to organizational inquiry, fails to incorporate key components). In this section some changes and additions to the conventional model are proposed. These modifications can be summarized as (1) greater attention to environmental factors associated with organizational systems, (2) recognition of properties which holistically describe the state of an organizational system, and (3) more detailed explication of basic open systems ideas relevant to organizational systems.

The last modification is facilitated through the labeling of the environment, inputs, throughputs, system properties, and outputs as constructs (i.e., terms which are recognized as theoretically incomplete and empirically inapplicable at their current level of abstraction—see Gibbs, 1972:125) and through the identification of concepts which are representative of each construct. These concepts, in turn, can be operationally defined and empirically evaluated. An overview of the constructs and concepts which are incorporated into the revised model is provided by the diagram in Figure 2.2. In addition, each construct and its component concepts are discussed below. The heritage of each construct within GST and organizational research is reviewed as well as past evidence of the construct's relationship with system output and/or organizational effectiveness. The concepts indicative of each construct are similarly identified and discussed. It should be noted that other
Figure 2.2. Expanded input-throughput-output model
alternative concepts might have been selected as aspects or dimensions of each construct. For the most part, those chosen were selected because of past research or theory documenting the existence of a relationship between the concept and organizational effectiveness. At the conclusion of the discussion related to each construct, general and subgeneral hypotheses are offered. The general hypothesis pertains to the relationship between the construct and system output effectiveness while the subgeneral hypotheses refer to the relationships between the representative concepts and system output effectiveness. Although this research is considered to be a theory-building effort rather than a theory-testing one, the use of hypotheses is thought to be justified for two reasons. First, hypothesis statements are a convenient means for summarizing current thinking about untested relationships and, secondly, they are useful in guiding the empirical assessment of theoretically posited relationships. The review of each construct commences with the environment.

**Organizational environment**

The environment of a system refers to a set of more or less distinguishable elements, states, or events defined as existing outside of system boundaries (relevant sources: Kuhn, 1974:25; Buckley, 1967:62; van Gigch, 1974:13). General systems theory clearly maintains that "environmental influences are not sources of error variance but are integrally related to the functioning of a social system, and that we cannot understand a system without a constant study of the forces that impinge upon it" (Katz and Kahn, 1966:27).
Environmental elements are especially relevant in organizational research. At the organizational level, the environment can be defined as those conditions external to the organization which influence its behavior (Nightingale and Toulouse, 1977). Miller and Rice (1967) have observed that environmental forces can constrain organizational choices. Organizations, like other open systems, can only exist by exchanging inputs and outputs with environmental elements. The empirical study of organization-environment relationships has only recently emerged as a topic of interest, with the bulk of research conducted since 1965. The dominant organization-environment paradigm is the contingency approach. In the contingency approach, organizations are viewed as open systems in constant interaction with their environments. This approach suggests that while there is no single best way to cope with environmental pressures, certain organizational structures are more appropriate than others (Lawrence and Lorsch, 1967; Hall, 1977; Pennings, 1975). Beyond the issue of appropriate organizational design, the contingency approach also implies that an organization's survival, growth, and effectiveness is dependent on its ability to adapt to environmental changes and constraints (Aldrich, 1972; Pennings, 1975). The fundamental principle is that organizations must develop structures and internal processes which are congruent with their environments in order to survive and that the more congruent these structures, the more effective the organization.1

1Alternatively, researchers (e.g., Georgopoulos, 1974; Child, 1975; Metcalfe, 1976) who contend that organizations can initiate actions which affect environmental elements might argue that organizations find or modify their environments to be consonant with their pre-existing structures.
The empirical findings related to the contingency approach are mixed (see Pennings, 1975 for a review). Efforts to document a relationship between an organization's environment (particularly technological elements) and organizational structure have been much more successful than research aimed at documenting a positive relationship between organizational-environment congruency and organizational effectiveness. Studies which report evidence contrary to the contingency outlook (e.g., Bidwell and Kasarda, 1975) have been criticized for failing to develop clear rationales concerning why particular combinations of environmental and structural variables should result in high or low organizational effectiveness (Hannan, Freeman and Meyer, 1976; Scott, 1977). In addition, numerous theoretical and empirical arguments continue to appear in support of the importance of environmental conditions in explaining organizational effectiveness (Hirsch, 1975b; Khandwalla, 1974). For these reasons, and because of the heavy emphasis on the environment in GST, the environment was retained as a crucial component in this research. Here, however, the relationship between selected environmental elements and organizational effectiveness will be emphasized rather than the congruency notion. While organizational structure may mediate in the environment-effectiveness relationship, it would seem logical to investigate the more simple bivariate relationship as well. The existence of ambiguous findings related to the contingency approach also supports this decision. Finally, the environmental construct is hypothesized to be related to system output effectiveness because past studies have indicated that environmental factors can have an impact on outcome
measures, apart from differences in management and treatment techniques" (Neuhauser and Andersen, 1974:99). This suggests that the environment can influence system output effectiveness independently of effects due to inputs, throughputs or system properties.

The concepts selected to represent the environmental construct are (1) perceived environmental uncertainty and (2) environmental instability. These concepts were chosen because they are generally recognized by organizational researchers (see Aldrich, 1972 and Jurkovich, 1974) and because of their implicit relationships with organizational effectiveness. Perceived environmental uncertainty is defined as the extent to which the environment is perceived as complex and unpredictable (derived from Jurkovich, 1974). Environmental instability is defined as the degree of turnover in environmental elements (derived from Aldrich, 1972). In this study, environmental instability will refer to the degree of change in selected demographic characteristics. The use of demographic characteristics as indicators of environmental elements is both common and useful in sociological research (Neuhauser and Andersen, 1974; Bidwell and Kasarda, 1975). Perceptions of high uncertainty and instability are each hypothesized to have a detrimental impact on organizational effectiveness. The rationale for these hypotheses stems from the observation that organizational environments are becoming increasingly more uncertain and are changing at faster and faster rates (Emery and Trist, 1965;

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2 Another restriction in the selection of environmental concepts for an empirical study is the need for sufficient variance in the concept. When one opts to employ a sample of organizations homogeneous in various respects, certain sources of variation are reduced. See Rice (1961) and Kimberley (1977) for discussion of these issues.
Terreberry, 1968). Growing environmental turbulence of this kind, according to Kast and Rosenzweig (1974) and Aldrich (1972), creates problems for organizations. As organizations are forced to divert increasing amounts of resources to the development and maintenance of adaptive/responsive mechanisms, it is reasonable to anticipate that effectiveness will decline, all other things being equal.

In summarizing this section on the environment the following general and subgeneral hypotheses are offered:

**G.H. 1:** The environment of a system is related to system output effectiveness.

**S.H. 1.1:** Perceived environmental uncertainty is negatively related to system output effectiveness.

**S.H. 1.2:** Environmental instability is negatively related to system output effectiveness.

**Inputs**

The inputs of a system are defined as the energies absorbed by a system or the information introduced into it (Berrien, 1968:24). Inputs can be further classified into maintenance inputs and signal inputs (Berrien, 1968; Bertrand, 1972). Maintenance inputs are those energies which power a system or prepare it to function (e.g., teachers in a school system). Signal inputs are those originally external elements which the system accepts for processing (e.g., students in a school system). Van Gigch (1974) also recognizes such a difference among inputs. He terms maintenance inputs "resources", reserving the label of "inputs" for signal inputs. While these distinctions are analytically useful, they have not been accorded general recognition by GST scholars and thus
seem somewhat premature for the current developmental level of GST. In addition, Bertrand (1972) has observed that it is often difficult to empirically distinguish between the two kinds of inputs. Accordingly, the separation of inputs into maintenance and signal classifications is not retained in this dissertation. Those who are interested in the distinction, however, will note that the concepts selected to represent the input construct are of the maintenance variety.

Inputs are considered to be a crucial aspect of open systems analyses because they "necessarily" modify the system in some way (Kuhn, 1974: 27). The extent and nature of this modification has not yet been empirically determined. In summary, present formulations of GST do not stipulate exactly how inputs affect system functioning; they merely contend that inputs do have an impact on at least some system operations.

Despite the lack of specificity manifested by GST scholars, many organizational researchers have interpreted the GST perspective to mean that outputs and organizational effectiveness are at least a partial function of inputs (e.g., Ackoff, 1960; Mulford and Klonglan, 1972; Bidwell and Kasarda, 1975; Hannan et al., 1976; Scott, 1977). This interpretation is frequently bolstered by conceptualizing the organizational system as a production process which converts inputs into outputs (Hage, 1974; Georgopoulos, 1974). (This rationale is developed apart from the application of the energetic input-throughput-output model.) In organizations characterized by assembly-line type work processes, the posited input-output relationship seems commonsensical.

Arguing that inputs can influence outputs and effectiveness makes
intuitive sense on other grounds as well. Katz and Kahn (1966) contend that most systems have control over the inputs they choose to absorb. Hannan and Freeman (1977) expand this observation and suggest that the extent to which organizations can identify appropriate inputs and screen out those which do not fit their needs is an aspect of effectiveness. The present researcher agrees with the idea that selectivity of inputs is important and helpful in establishing a direct link between inputs and outputs, but would prefer to view this property as a determinant rather than an aspect of effectiveness.

These logical rationales developed by organizational researchers are sufficient to justify the hypothesis of a relationship between inputs and system output effectiveness. A disclaimer is necessary, however, in view of comments made by some researchers who are in fundamental agreement with the hypothesis. These researchers express reservations concerning the likelihood of securing empirical evidence of a direct link between input and output variables. Georgopoulos (1974:12) for example, notes that the relationship between inputs and outputs can be mitigated by other organizational processes "which intervene to modify very substantially any zero-order relationships that one might find." Scott (1977) relates case study examples which illustrate the difficulty in analyzing input differences which purportedly affect outputs. Taken together, these disclaimers suggest that inputs may only manifest indirect impact on system output effectiveness. Unfortunately, this hypothesis cannot be evaluated in the present research (i.e., decomposition of effects within a multivariate model requires that constructs
be perfectly defined—see p. 24 and Heise, 1972).

The concepts selected to represent the inputs construct are (1) level of skills, (2) level of experience, and (3) perceived resource support. The level of skills concept refers to the occupational abilities of organizational members and can more ordinarily be defined as the average level of educational attainment. Level of experience is equatable with the tenure of organizational members. Georgopoulos (1974) argues that effective organizations are able to attract and retain well-qualified personnel, which implies that skill and experience are important determinants of effectiveness. The hypothesized relationship between skills and effectiveness is supported by Bidwell and Kasarda's (1975) finding of a positive relationship between the degree of staff qualification and aggregated student achievement (conceptualized as organizational or school district effectiveness). Mott (1972) reports empirical evidence supporting both propositions. He found that the skill level among organizational members was positively related to productivity, flexibility and overall organizational effectiveness and that experience levels were positively correlated with organizational flexibility. While skill and experience adequately reflect some of the energies absorbed by an organizational system, material energies are also thought to be important (Katz and Kahn, 1966). Perceived resource support refers to the degree to which other forms of support are believed to be available to the organization. This concept is hypothesized to be positively related to system output effectiveness. Past empirical support of this proposition is provided by Bidwell and Kasarda's (1975)
finding of a positive correlation between fiscal support of a school district and school district effectiveness.

This section describing the input construct can be summarized by formally stating the general and subgeneral hypotheses discussed:

G.H. 2: Inputs of a system are related to system output effectiveness.

S.H. 2.1: Level of skills is positively related to system output effectiveness.

S.H. 2.2: Level of experience is positively related to system output effectiveness.

S.H. 2.3: Perceived resource support is positively related to system output effectiveness.

Throughputs

Throughputs of a system refer to the transformation of energies within a system (Katz and Kahn, 1966). More specifically, they are the structural arrangements and processes whereby inputs are converted into outputs. Some GST scholars prefer to use the phrase conversion processes rather than throughputs (e.g., van Gigch, 1974). This usage is rejected here as (1) it places undue emphasis on processes, ignoring structure and (2) the conversion term implies a unidirectional sequence of activities. To avoid this interpretation, the throughput construct is said to incorporate both structural and processual elements which can mutually influence each other.

In many general systems analyses, throughputs are equated with or subsumed under the "black-box" concept (Berrien, 1968:17-19). The black-box is viewed as a convenient means for handling any elements which intervene between an input and output relationship. By explicating
throughputs within a particular unit of analysis, greater specifica-
tion of black-box components can hopefully be achieved.

Because organizations are assumed to be purposeful systems, through-
put arrangements and activities can be viewed as work which occurs in
the interest of a goal (Bertrand, 1972). As the goals of organizations
vary, so do the corresponding throughputs. The specification of through-
puts must necessarily take the organization of interest into account.
In this research, the throughputs examined are restricted to human ori-
ented types of processes. Structural arrangements, while certainly im-
portant, do not manifest sufficient variance for empirical evaluation
(see footnote 2). The identification of human work processes reflects
the labor intensive nature and goals of the organization. The human
work processes selected are discussed below as the representative con-
cepts.

Organizational throughputs are argued to be a determining factor in
organizational output and effectiveness (Ackoff, 1960; Mulford and Klong-
lan, 1972; Pennings and Goodman, 1977). The role of throughputs within
an organizational system is well-described by Georgopoulos (1973:105):

Even if the outputs of the system are precisely speci-
fied, and our knowledge of its inputs is very high, however,
we still cannot predict performance or assess the effectiveness
of the system, unless we are also able to understand and take
into account the major intervening problems and processes of
organization. Simple input-output models do not suffice. Be-
tween input and output, there are the critical processes of
resource allocation, of coordination of effort, of social and
psychological integration, and of organizational strain and its
management, all of which intervene to modify very substantially
any zero-order relationships that one might find between input
and output variables. An organization may have excellent inputs
in terms of quality, cost, and amount, but a very poor output
because these social-psychological processes may be generating dysfunctions and problematic outcomes for the system or may be taking place in ways which do not optimize efficient performance by the system, its subsystems, or members. Many of the enduring and most critical problems of organizations are associated with these intervening processes and their outcomes.

From a theoretical vantage point, there seems to be consensus that there is a relationship between throughputs, as a construct, and outputs. No empirical evidence of such a relationship was found however. The throughputs construct, nevertheless, is pivotal in the open systems perspective. Accordingly, this research will empirically assess the hypothesis of a relationship between throughputs and system output effectiveness.

The concepts used to represent the throughputs construct are (1) socialization, (2) communication and (3) commitment. These particular concepts were selected because they constitute major components of a middle range theory of organizational effectiveness devised by Etzioni (1975). Briefly, Etzioni has proposed that the best means of achieving compliance among lower participants of an organization is to match the type of organization (i.e., coercive, rumenerative, or normative) with an appropriate kind of member involvement (i.e., alienative, calculative or moral). When an organizational type is characterized by the appropriate kind of involvement, it is said to manifest a congruent compliance structure. Congruent compliance structures, in turn, are held to be more effective than noncongruent structures (Etzioni, 1975:112). As the organization used in this study is primarily normative (see Etzioni, 1975:31, 40-67), moral involvement is deemed the most desirable kind of
member involvement. High moral involvement among lower participants means that member-participants are personally committed to the organization. Accordingly, in normative organizations, commitment is assumed to be a necessary condition for the achievement of a congruent compliance structure, and, by extension, a prerequisite to organizational effectiveness. Regressing a step further, Etzioni (1975) suggests that socialization and communication processes can be used to modify or reinforce the initial commitment position of lower participants. In summary, Etzioni proposes a chain of relationships using socialization, communication, commitment and congruence to explain effectiveness in normative organizations. These relationships are graphically described in Figure 2.3.

Empirical assessments of the Etzioni theory have been limited in their coverage of the hypothesized relationships. Most research has focused on the relationships between compliance concepts (e.g., socialization, communication) and effectiveness, rather than upon the relationship between congruent compliance structures and effectiveness. Etzioni (1975:392) reports that the most comprehensive efforts to evaluate his theory are contained in the Iowa State Compliance Studies (e.g., Mulford et al., 1968; 1972a; 1972b; Warren et al., 1976). This series of studies, which investigated both normative and utilitarian organizations, found a positive relationship between socialization and effectiveness and between communication and effectiveness in nearly every case. Commitment, unfortunately was not included in these studies. Etzioni's theory and the supportive research reviewed indicate that the throughput...
Figure 2.3. Relationships among throughput concepts and effectiveness in normative organizations, following Etzioni (1975)

*Not considered in this research.
concepts identified are related to system output effectiveness. Other writings relevant to these concepts are discussed below.

**Socialization**

Socialization is defined as the acquisition of the requisite orientations for satisfactory functioning in a role (Parsons, 1951:205; Etzioni, 1975:245). Kuhn (1974:316) discusses socialization as the process whereby a new member of an organization acquires role behavior; i.e., how a new member is transformed from an individual to a component subsystem. At the organizational level, socialization can be defined as the influence process through which an individual learns the values, goals and norms of an organization (Schein, 1967). Likert (1967) as well as Bowers and Seashore (1966) suggest that socialization mechanisms which reflect organizational goals and high standards of performance promote organizational effectiveness. Barrett (1970) reports that organizations which emphasize socialization activities are also characterized by high levels of goal integration and organization functioning. Mulford et al. (1976) found a positive relationship between socialization and six types of organizational effectiveness. Finally, Hage (1974) argues that quality control within an organization, which might be conceptualized as a dimension of effectiveness, can be achieved through (1) programming with sanctions or (2) high feedback with socialization (emphasis added). It is apparent, however, that Hage's notion of feedback with socialization also refers to communication rates.

In this study, socialization is ordinarily defined as the perceived adequacy of job orientation and training activities. This definition emphasizes instrumental, as opposed to expressive, socialization. The
theory and research associated with socialization suggest that it is positively related to system output effectiveness.

Communication is defined as a symbolic process by which the orientations of system participants are reinforced or changed (see Etzioni, 1975:397-398). In this dissertation, communication is considered as an intrasystem process. This is in contradistinction to Kuhn (1974) and other general systems theorists who use this term to refer to information exchange and feedback across system boundaries. The study of intrasystem communication within a general systems framework has only recently begun (Hage, 1974). In contrast, a great deal of communication research has transpired within the context of an organizational setting.

Organizational researchers have expressed a wide range of opinion concerning the importance of communication processes within the organization (Katz and Kahn, 1966; Hall, 1977). A critical examination of the topic, however, can leave little doubt about the indispensability of communication. As Hall (1977:268) points out, even in highly mechanized operations, communications underlie the development and use of machines. The lack of consensus regarding the importance of communication concepts may stem from the lack of a clear taxonomy of communication terms. Such ideas as frequency, direction and accuracy of communication are often not specified or treated as separate concepts. In this study, the frequency of horizontal communication within an organizational subunit is investigated.

The relationship between (various aspects of) communication and
organizational effectiveness has frequently been examined. Ackoff (1960) treats the study of intraorganizational communication as an approach to the study of organizational effectiveness. Likert (1967) argues that organizations with "System 4" structures, which are characterized by free communication flows, have the best performance records. Others stressing communication as a determinant of effectiveness include Barnard (1938), Miller (1972), Argyris (1973); Miles (1973), Price (1968), Pennings and Goodman (1977), and Steers (1977).\(^3\) Katz and Kahn (1966: 243) summarize the content of these scholars' arguments by stating that communication is "critical for effective system functioning." Additional, empirical support of a positive relationship between frequency and/or openness of communication and organizational effectiveness is provided by Mott (1972) and Mulford et al. (1976).

In this dissertation, communication is ordinarily defined as the extent to which organizational members exchange job-related ideas, opinions, and information. This form of communication is hypothesized to be positively related to system output effectiveness.

**Commitment** Commitment is defined as the willingness of system members to remain in and exert high levels of effort on behalf of the system (derived from Buchanan, 1974). Kuhn (1974: 487) suggests that commitment is an explicit or implicit bargain that a relationship between a component (actor) and the system will continue. Few discussions of commitment as a general systems concept were located. At the

\(^3\)Steers (1975) notes, however, that other researchers have posited communication as a dimension of organizational effectiveness.
organizational level, commitment can be defined as the extent to which organizational members desire to remain in, meet the goals of, and expend high levels of effort for the organization. Although there continues to be some ambiguity concerning whether commitment is a determinant or dimension of organizational effectiveness, there is evidence of a positive relationship between commitment and effectiveness (Steers, 1977). Steers reviews relevant theory and research which indicate that commitment is a useful predictor of employee attendance, retention, job involvement, and effort. These findings suggest that there is a positive relationship between commitment and system output effectiveness.

In this section devoted to throughputs, each of the concepts identified (i.e., socialization, communication, commitment) was hypothesized to be positively related to system output effectiveness. Various theoretical and empirical sources were reviewed to support these propositions. In addition, Pennings and Goodman (1977) contend that socialization, communication and other motivational processes like commitment are internal determinants of organizational effectiveness. They explicitly state that motivational concepts represent a viable area of effectiveness research. Accordingly, the following general and subgeneral hypotheses are proposed:

G.H. 3: Throughputs of a system are related to system output effectiveness.

S.H. 3.1: Socialization is positively related to system output effectiveness.

S.H. 3.2: Communication is positively related to system output effectiveness.
S.H. 3.3: Commitment is positively related to system output effectiveness.

**System properties**

System properties are analytical characteristics of open systems (relevant sources: Berrien, 1968; Katz and Kahn, 1966; van Gigch, 1974; Dubin, 1969; 1975). System properties (or states) describe a condition of the entire system. Kuhn (1974:25) provides some examples of general system states: color, temperature, rate of flow, magnitude, physical location, chemical composition, degree of excitation, on-or-offness, and amount or type of information possessed. Researchers are only now beginning to identify system properties which describe open systems. Even less attention has been rendered to the identification of system properties relevant to purposeful systems. Hence, the proposed addition of a system properties construct to the basic input-throughput-output model is an untested innovation and represents the most exploratory aspect of this research.

System properties can be conceptualized as features of the entire system (i.e., characteristics of the system as a whole). Dubin (1969) suggests that we need a vocabulary for describing systems holistically because (1) systems undergo continuous change over time and (2) because the system itself may change; that is, its fundamental character may be altered. System properties can be more readily understood by contrasting them with throughputs and inputs. Inputs and throughputs each

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4 It should be noted that "system states" and "system properties" have been used to refer to intermediate inputs or outputs visible in a conversion process (Cortes et al., 1974). This usage is not followed in this research.
contain "variables" or concepts which describe an aspect of the system. According to Dubin (1975:110), these "variables" manifest patterns of interrelationships which define new properties termed states of the system. In other words, although he does not use the inputs/throughputs language, Dubin sees system properties as properties emerging from the interaction of input and throughput concepts. These interaction or emergent properties are regarded as holistic in order to underscore the idea that a system property reflects more than one system element.

It should be noted that while the recognition of organizational system properties is a relatively recent development, the ideas and concepts identified as specific system properties are not necessarily new to organizational research. The concept of negentropy (i.e., the ability to resist disorganization), for example, is proposed as a system property in this study. Organizational researchers have dealt extensively with one operationalization of this concept, personnel turnover (Price, 1977). It is the overarching theoretical interpretation attached to turnover that is contended to be unique, not the concept itself.

Georgopoulos (1973; 1974) is another advocate of the systems properties notion. He states that what is critical for an organization is not just its input-transformation-output work cycle, but its overall problem-solving capacity. The organizational researcher's task is to specify "the patterns of interrelationships among the various elements of the organizational system which would make it most effective from the standpoint of its overall problem-solving capacity and ability" (Georgopoulos, 1973:103). Georgopoulos infers that certain patterns of
interrelationships, or system properties, are associated with greater problem-solving ability. Problem-solving ability, in turn, might be considered as a type of organizational effectiveness. Indeed, some organizational researchers have identified system properties as a set of surrogate measures of organizational effectiveness (Campbell, 1977; Kahn, 1977). Campbell (1977:30), for example, suggests "that since ultimate criteria of organizational functioning are so hard to conceptualize and measure, the next best thing is to measure variables representing the state of the system". Kahn (1977:242) counters this proposal, however, by arguing that the use of such surrogate indicators confounds predictors with the criteria they are supposed to predict. The present researcher concurs with Kahn and adopts the stance that system properties are most properly viewed as determinants and not dimensions of organizational effectiveness.

The inclusion of a system properties construct is asserted to be a useful mechanism for more accurately explicating these GST principles for organizational research. It provides (1) a category for describing emergent properties associated with organizational functioning, (2) it provides a means for incorporating concepts indicative of the interrelationships and interdependence among organizational components and (3) it reaffirms the importance of viewing an organization as a holistic unit. The system properties construct is also hypothesized to have an impact on system output effectiveness. Berrien (1968:33) explicitly offers the proposition that the state of a system is one determinant of the output. In addition, the foregoing remark by Georgopoulos (1973:103)
suggests that system properties may be beneficial in understanding organizational problem-solving ability, a possible dimension of organizational effectiveness.

The selection of concepts to represent the system properties construct at the organizational level was governed by recognition of the system property as an attribute of open systems, following Katz and Kahn (1966), and by previous research relating the property to organizational effectiveness. The four holistic concepts chosen were (1) vertical suprasystem feedback, (2) horizontal suprasystem feedback, (3) negentropy, and (4) dynamic homeostasis. In the following sections, each of these four concepts is discussed in greater detail. Before proceeding to this task, however, the notions of vertical and horizontal suprasystem merit comment.

A suprasystem (supersystem) is a larger system of which a given system is a component (Kuhn, 1974:508; Berrien, 1968:32-33). Toronto (1975) describes a suprasystem structure as the totality of relations holding between systems, one of which is the focal system. What distinguishes the focal system from the suprasystem (or a system from a subsystem) is purely an analytical distinction (see discussion on assumptions, p. 18). At the organizational level, researchers (e.g., Warren, 1963; Turk, 1970) have found a similar analytical distinction based on vertical and horizontal "patterns" or "ties" useful. Essentially, vertical ties are related to an organizational unit's relationships with other organizational units above or below it, vis-a-vis some established hierarchy of organizational units (e.g., relations between a branch
office and a parent organization). In this research, an organizational subunit is the focal unit of empirical examination and the relevant vertical suprasystem is identified as the immediate superordinate administrative unit within the overall organization. Horizontal ties pertain to an organizational unit's relationships with other social systems said to be a part of another, more macroscopic system (e.g., relations between an organization and other organizations located in the same city). For the organizational subunits studied in this research, the relevant horizontal suprasystem is defined as the community in which the unit is located. Community, in turn, can be defined as the county in which an organizational unit is located. While only two suprasystems are included in this study, it is possible to discern additional suprasystems. There can be multiple suprasystems within a single environment (Miller, 1971). The number of suprasystems identifiable is limited only by the analytical criteria invoked by the researcher. Finally, the importance of suprasystems in organizational analysis should never be underestimated as suprasystems are said "to impinge upon the activity, productivity, and the effectiveness of the focal system" (Toronto, 1975:146).

**Vertical and horizontal suprasystem feedback**  
Vertical suprasystem feedback is defined as the extent to which a specified vertical suprasystem relates useful information pertaining to system output back to internal system components. Horizontal suprasystem feedback is similarly defined as the extent to which a specified horizontal suprasystem relates useful information pertaining to system output back to internal
system components. It is generally assumed that, in purposeful systems, feedback information will be used to guide and steer future system operations (Chin, 1971). The importance of feedback to smooth organizational functioning has been stressed by GST scholars and organizational researchers alike (Homans, 1950; Katz and Kahn, 1966; Thompson, 1967; Berrien, 1968; Blau, 1970; Hage, 1972; 1974; and van Gigch, 1974). Feedback from the external environment (i.e., suprasystems) is hypothesized to facilitate system functioning and effectiveness because it provides information related to achievement of purpose, efficiency and the reactions of suprasystems to system performance. This makes it possible for the system to correct deficiencies or initiate new activities in the interest of increasing system output effectiveness, all other things being equal. The "all other things being equal" stipulation is especially important in this proposition as organizations can misinterpret, ignore, or otherwise fail to modify their behavior in conjunction with feedback information. Support for this general proposition relating feedback and effectiveness rests primarily on theoretical formulations rather than empirical research.

Miller (1972:93) contends that organizational survival is contingent on feedback from the environment and that effectiveness is a function of external feedback. He argues that an organization will not be effective unless it has free, undistorted information about the environment.

5 These definitions of feedback concepts are rather limited in scope. Feedback, which might more generally be defined as flow of information, is a multidimensional concept that can be explicated in a wide variety of ways (see Miller, 1972:113).
and special considerations from relevant suprasystems. In nonprofit organizational systems, Miller (1972:92) notes how public support indicators serve as feedback devices. This is comparable to the horizontal suprasystem feedback concept employed in this study. When the individual organizational member is selected as the unit of analysis, there seems to be a positive relationship between positive feedback reinforcement and subsequent job performance (Lorsch and Morse, 1974). Weick (1974) hypothesizes a relationship between negative feedback and individual performance but indicates that he cannot determine which concept is the more influential on the other. Scott (1977) suggests that organizations develop and use their feedback processes as a means of monitoring public opinion and the opinions of other external constituencies. If publics become dissatisfied, and feedback channels are open, the organization will have sufficient time to correct the problem before it becomes serious. Finally, Mott (1972:92) reports a positive relationship between perceived adequacy of communication from an administrator to an organizational staff (analogous to vertical suprasystem feedback) and three measures of organizational effectiveness. This review of contemporary theorizing and research related to feedback indicates that one should anticipate (1) a positive relationship between vertical suprasystem feedback and system output effectiveness and (2) a positive relationship between horizontal suprasystem feedback and system output effectiveness.

Negentropy Negentropy refers to the capacity of a system to arrest entropic processes; that is, to resist disorganization and
death (relevant sources: Katz and Kahn, 1966; Berrien, 1968). Systems acquire negentropy by importing more energy inputs from the environment than they expend and by storing the surplus energy for future use. Van Gigch (1974:48) suggests that systems can also increase their level of negentropy by correctly and efficiently processing information. The storing of energy and processing of information can thus be viewed as a technique for reducing the trend toward system disorganization. A more restricted definition of negentropy is adopted here: negentropy refers to a social system's ability to store energy for future use. At an even lower level of abstraction, negentropy can be defined as a system's ability to conserve energy by reducing personnel turnover.

Organizational researchers have readily extended the concept of negentropy to organizational research (e.g., Katz and Kahn, 1966; Thompson, 1967; Miller, 1972; Georgopoulos, 1974). As in this study, personnel turnover is the most common conceptualization used. High turnover is hypothesized to have a negative impact on organizational effectiveness because new employees are often inexperienced and unfamiliar with organizational operations (Miller, 1972:112). Miller reports that high turnover among organizational leaders is particularly disrupting to organizational processes. This contention is supported by Kasarda's (1973) finding that increased turnover often necessitates increases in administrative staff relative to production personnel. Price's (1977) recent review of empirical studies relating turnover and organizational effectiveness concludes that turnover generally does have a negative impact on effectiveness but that the evidence to support this proposition
is far from overwhelming. Price (1977), Steers (1977) and others have observed that at least minimal levels of turnover can be useful in removing ineffective employees, facilitating change, providing fresh sources of ideas, etc. The hypothesis to be tested here, however, reflects the majority stance; negentropy is hypothesized to be positively related to system output effectiveness.

**Dynamic homeostasis** Homeostasis refers to a system's ability to maintain a steady state over time (see Kuhn, 1974:28). A steady state is not a true equilibrium or balance because of the continuous intake of elements and output of products. That is, the continuous activity of the system means that the system components are constantly changing but that these changes transpire in such a manner that the character or basic framework of the system is preserved, the input/output ratio remains within certain bounds, and that the fundamental relations among the system parts remain the same (see Katz and Kahn, 1966). The dynamic modifier pertains to the capacity of living systems to anticipate or react to various disturbances. The subsequent activation of adjustive processes (e.g., growth, buffering, leveling) can result in a permanent change of some basic system feature and thus a new system character can be instituted. In other words, in order to maintain a steady state, a system may have to change its particular structure (Buckley, 1967:15). Such a change is often referred to as a moving equilibrium process. Hage (1972:215) describes dynamic (moving) equilibrium as a major change among the states of a system. Ackoff (1971) captures the essence of dynamic homeostasis by stating that a homeostatic system is one that
retains its state in a changing environment by internal adjustments.

Dynamic homeostasis, then, can be defined as a system's ability to maintain its fundamental character over time. The preservation of system character in systems of social organization can be equated with the maintenance of common values and interdependence among system parts. In accordance with this view, dynamic homeostasis is treated as a multidimensional concept composed of two less abstract concepts: internal integration and external integration.

At a very abstract GST level, integration can be defined as the total set of interactions between and contingent behaviors of, the occupants of an organization's roles, whose joint result is to fulfill the organization's goals; or, any mutually advantageous interaction (Kuhn, 1974:496). This research employs a more ordinary conceptualization of integration by restricting its scope to agreement on values and interdependence. More specifically, internal integration is defined as the degree of agreement on values and mutual interdependence among members of an organizational system (derived from Price, 1972; Olsen, 1968; Landecker, 1951). External integration is defined as the degree of agreement on values and mutual interdependence between a social system and relevant suprasystems. In this study, two relevant suprasystems have been identified, the vertical suprasystem and the horizontal suprasystem (see previous discussion on feedback). These two types of external integration, vertical and horizontal, are analyzed separately in this research in order to discern the extent to which each concept individually contributes to the understanding of system output effectiveness.
The concepts of dynamic homeostasis and integration have been used in organizational research for a number of years. Bakke discussed the importance of "homeostatic activities" within social organizations in 1959. He (1959:114) described these activities as "synergic" or "combinations of other activities" transpiring within the organization which deal with the problem of maintaining the organization "in the face of internal and external conditions and changes in those conditions." Although Bakke did not specifically relate homeostatic activities to system output or organizational effectiveness, he did contend that homeostatic activities serve to reduce the strains and stresses which can threaten the stability, integrity and viability of the organization. Katz and Kahn (1966) proposed dynamic homeostasis as one of the nine basic characteristics of organizations-as-open-systems, and, along with Kuhn (1974), imply that organizational survival is dependent upon the maintenance of a dynamic equilibrium. Applications of the notion of dynamic equilibrium to organizational inquiry are increasingly common. Bertrand (1972:100), for example, describes a school as manifesting dynamic homeostasis "when it receives, processes, and exports students within a community in a generally acceptable fashion, although the number of students may change from year to year." However, empirical research using dynamic homeostasis is negligible. In contrast to dynamic homeostasis, integration has received both theoretical and empirical attention in organizational research.

Like many concepts reviewed thus far, integration has been conceptualized as both a determinant and dimension of system output.
effectiveness (Steers, 1975). However, Pennings and Goodman (1977) convincingly argue that integration activities are responsible for variations in organizational effectiveness. Mott (1972:52-62) theoretically and empirically examined the relationship between various types of integration (internal, vertical, and external) and organizational adaptation and found them to be positively related. These findings suggest that integration and effectiveness might be positively related. Another argument supportive of this proposition can be cited. Some organizational researchers have extended the principle of equifinality to organizational research by suggesting that there is no singular, "best", way to structure an organization (Thompson, 1967; Lawrence and Lorsch, 1967; Woodward, 1965; Lorsch and Morse, 1974). These researchers, sometimes classified as contingency theorists, assert that it is most useful to view organizations as open systems which can maximize their effectiveness by devising coordination mechanisms which are appropriate to the characteristics of their environments and/or organizational missions (Lawrence and Lorsch, 1967). A primary coordination mechanism according to Lawrence and Lorsch (1967) is the maintenance of an appropriate level of integration among organizational members. However, contrary to their congruency theory, they report empirical evidence indicating that, regardless of external environmental conditions, high performing organizations exhibit high internal integration. This finding directly supports the hypothesis that internal integration is positively related to system output effectiveness. The logic behind this proposition can also be theoretically extended to justify the hypothesis of a positive
relationship between external integration and system output effectiveness. That is, from the organization's point of view, the vertical and horizontal suprasystems are equivalent to the environmental characteristics requiring "appropriate" coordination mechanisms. If integration between the organization and its suprasystems is identified as an appropriate coordination mechanism, high integration levels should promote coordination and subsequent system output effectiveness.

This discussion of dynamic homeostasis concludes this section on system properties. Each of the system properties selected for examination (i.e., vertical suprasystem feedback, horizontal suprasystem feedback, negentropy, internal integration, vertical external integration, horizontal external integration) is asserted to be positively related to system output effectiveness. The general and subgeneral hypotheses can now be stated:

G.H. 4: System properties are related to system output effectiveness.

S.H. 4.1: Vertical suprasystem feedback is positively related to system output effectiveness.

S.H. 4.2: Horizontal suprasystem feedback is positively related to system output effectiveness.

S.H. 4.3: Negentropy is positively related to system output effectiveness.

S.H. 4.4: Internal integration is positively related to system output effectiveness.

S.H. 4.5: Vertical external integration is positively related to system output effectiveness.

S.H. 4.6: Horizontal external integration is positively related to system output effectiveness.
System output effectiveness

System outputs are conceptually defined as those energies, information, or products discharged by a system into a suprasystem (Berrien, 1968:27; see also Kuhn, 1974:27). Outputs may also be conceptualized as the results of the throughput process (see van Gigch, 1974:12; Katz and Kahn, 1966:20). Berrien (1968) notes that two classifications of output exist: products useful to suprasystems and waste products. Waste products will not be considered in this analysis. Berrien's classification, however, underscores an important point. In order for a system to survive, the exported outputs must be acceptable to relevant suprasystems. Accordingly, one criterion for the effectiveness of system output is the level of approval it receives from relevant suprasystems (e.g., vertical and horizontal suprasystems). Beyond the approval of relevant suprasystems, the GST perspective provides two additional guidelines for the evaluation of outputs. Systems which have purposes or goals can be examined in terms of the extent to which specified objectives are accomplished (see van Gigch, 1974). Another system effectiveness criterion is the efficiency of the output process. Over time, system survival is dependent on an arrangement where outputs do not exceed inputs. The GST perspective thus supplies criteria for the evaluation of system output effectiveness which reflect both external (i.e., suprasystem(s) approval) and internal (i.e., achievement of purpose; efficiency) considerations. In addition, because they are part of a deductive theoretical framework, these criteria manifest the potential for generalizability and subsequent intersystem comparisons. This interpretation and explication of system
output effectiveness is untested and unique to this research. Hence, the construct itself and its component concepts require further elaboration and discussion.

General conceptualization issues In many general system analyses, survival and perpetuation of the system's species are the primary measures of effectiveness. This is valid for some kinds of systems, but not all. In purposeful social systems, survival is "an essential but not all-inclusive measure of effectiveness" (Kast and Rosenzweig, 1972:456). It is asserted here that organizational systems must maintain minimal levels of effectiveness with respect to approval of suprasystems, achievement of purpose and efficiency in order to assure their survival. However, once these self-maintenance levels are reached, there is still a considerable range in the possible level of success achievable in each criterion area. An alternative way to state this argument is to say that approval, goal attainment and efficiency are variable, rather than attribute, concepts (i.e., these concepts can be described in terms of how much of the characteristic is possessed and not merely in terms of whether a survival-nonsurvival amount exists). In summary, system output effectiveness is analytically distinct from notions of system survival. System output effectiveness is defined as the degree to which a system receives approval from relevant suprasystems, achieves its purposes, and is efficient. Attention is now directed toward the component concepts of the system output effectiveness construct.

The system output effectiveness construct, as explicated in this research, consists of four concepts: (1) vertical suprasystem approval,
(2) horizontal suprasystem approval, (3) achievement of purpose, and (4) efficiency of the output process. The vertical and horizontal suprasystems are identical to the suprasystems specified in the discussion of vertical and horizontal feedback. As in the discussion of the previous constructs, these concepts are viewed as a representative rather than a comprehensive specification of the content of the construct. However, the researcher does feel that this construct is rather adequately represented. Its theoretical coverage is asserted to be deficient only in the sense that additional suprasystems may exist which are not included in a given analysis. As such, the construct may more nearly approximate the definition of a multidimensional concept (i.e., a concept which must be broken down into other less abstract concepts before it can be operationalized). However, this conceptualization is rejected because there is no theoretically based reason to expect the explicated concepts (dimensions) to be positively related to each other. An over-emphasis on securing the approval of a particular suprasystem, for example, might result in the diversion of system resources away from purposeful activities and ultimately result in lower achievement of purpose. This interpretation is counter to the typical manner in which social scientists formulate concepts and their subsequent measures. Researchers usually assume that dimensions, subconcepts, indicators, etc., are determined by an overarching theoretical construct (Jacobson and Lalu, 1974; Heise, 1972). This assumption, in turn, necessitates that one believe that constituent dimensions (e.g., approval and achievement of purpose) of a construct be positively interrelated. The hypothetical
example suggests this interrelationship may not characterize system output effectiveness. Hage (1972) and Heise (1972) discuss the implications of constructs and concepts with "incompatible" components and suggest that additional investigation is needed. Heise (1972) makes some headway by proposing that the dimensions can be treated as determinants of the higher-order construct. This would seem to be the best way to handle such situations, provided one is willing to make the auxiliary assumption that the set of dimensions, subconcepts, indicators, etc. perfectly defines the unmeasured notion. That is, one must be willing to treat the unmeasured notion as a concept and not a construct. Given that system output effectiveness is viewed as a construct, in this research, and that the explicated concepts may not be positively interrelated, it was decided to treat each system output effectiveness concept as a separate dependent variable in the empirical analysis. This decision is also consistent with the recommendation of Schmidt and Kaplan (1971) that separate criteria be retained when the purpose of a research effort is the comprehension of a multidimensional concept.

Organizational output effectiveness An implicit proposition in this research is that the use of general systems effectiveness criteria in the evaluation of organizational effectiveness may provide a solution to a long-standing problem in organizational research. The problem of what constitutes organizational effectiveness has plagued organizational researchers for literally decades (see assessments by Katz and Kahn, 1966; Yuchtman and Seashore, 1967; Hunt, 1972; Steers, 1975, 1977; Spray, 1976; and Goodman et al., 1977). The following excerpt from Steers
(1975:546) summarizes the present "state of the art" relevant to organizational effectiveness:

The concept of organizational effectiveness is encountered repeatedly in the literature on organizations, but there is only a rudimentary understanding of what is actually involved in or constitutes the concept. In fact, although effectiveness is generally considered a desirable attribute in organizations, few serious attempts have been made to explain the construct either theoretically or empirically.

Several benefits may accrue from the adoption of system output effectiveness criteria as criteria of organizational effectiveness. First, by viewing effectiveness as something more than survival, the common teleological problem of asserting that an organization is effective because it continues to function is avoided. As Georgopoulos (1974: 27-28) states, organizational survival is only a simple and primitive level of organizational effectiveness. Another potential benefit is a clear separation between determinants of organizational effectiveness and aspects (or dimensions) of effectiveness. In this researcher's opinion, the failure to achieve consensus regarding the composition of organizational effectiveness is a devastating critique. Researchers have known for a long time that agreement over the content of a criterion is a necessary prerequisite to specification of predictors. Yet only recently has attention become focused on the problem of separating effectiveness determinants from results (Steers, 1975; Campbell, 1977; and Kahn, 1977). The deductive nature of the GST model generated here permits an unambiguous delineation of what organizational effectiveness entails. It defines organizational effectiveness in terms of outcomes (i.e., approval, achievement of purpose, efficiency), and treats the
structures and processes which affect these outcomes as hypotheses re-
quiring confirmation. Examination of this one model of organizational 
effectiveness would at least temporarily eliminate the consensus problem 
and permit the evaluation of the model in different organizational set-
tings. Such a unified effort might also facilitate the development of 
general measures of organizational effectiveness. These measures are 
sorely needed as Hall (1977) reports that, except for profit-making 
or-organizations, no such general measures exist.

A third potential benefit centers on the resolution of a thorny 
problem-issue known in organizational research as "multiple constituenc-
ies". Constituencies are interest groups that define organizational 
effectiveness (Pennings and Goodman, 1977). These interest groups may 
be internal or external to the organization. The basic problem is that 
various constituencies can and often do define effectiveness in mutually
incompatible ways. In such situations, the organization can never be 
evaluated "effective" by all of the constituencies at the same time. By 
recognizing that organizational-systems must simultaneously deal with 
their subsystems and suprasystems, GST anticipates the potential problem 
of incompatible effectiveness criteria. System output effectiveness,
and by extension, organizational effectiveness, is defined such that 
these differences are expected and accepted. This solution to the pre-
ence of incompatible criteria seems preferable to the recommendations 
of Dubin (1976:8) and others who contend that internal and external 
evaluations of organizational effectiveness are simply "worlds apart"
and irreconcilable.
A final potential contribution associated with the application of GST to the study of organizational effectiveness is related to the issue of relationships among effectiveness dimensions. The interpretation of GST principles developed here suggests that there is no necessary pattern of interrelationships among dimensions of effectiveness. This contention is extremely consistent with empirical research related to organizational effectiveness (Hall, 1977; Kahn, 1977; Molnar and Rogers, 1976; Scott, 1977; Friedlander and Pickle, 1968; Katz and Kahn, 1966; Seashore et al., 1960). Not only do assessments rendered by various constituencies differ, but even the effectiveness criteria developed for and by a single organization have been shown to be unrelated to each other (Hall, 1977:87). As most organizational researchers have viewed organizational effectiveness as a set of dimensions determined by an abstract entity identified as effectiveness (Steers, 1975), these findings are quite disturbing. One would anticipate that such dimensions would manifest positive and moderate in magnitude intercorrelations. Researchers have tended to resolve findings inconsistent with this premise in one of three ways: (1) they define the meaning sphere said to be incorporated in their conceptualization of effectiveness by restricting it to dimensions which manifest the desired psychometric properties; (2) they reject standard psychometric criteria as a necessary requirement for concept validity and, instead, place emphasis on theoretical criteria, concepts by induction, etc.; or (3) they report multiple criteria of effectiveness, often justified via a "multiple frames of reference" argument. A discussion of the implications of these treatments for a
general theory of organizational effectiveness is reserved for the final chapter of this dissertation. However, it would seem that the model of effectiveness being developed here has the potential to circumvent the problem of uncorrelated dimensions. In so doing, it also allows for the eminently reasonable notion that organizations may not be able to maximize all aspects of output at the same time (see Hage, 1972). Tradeoffs among effectiveness criteria may be an inevitable fact of organizational life.

In this research, the effectiveness criteria identified as appropriate for the evaluation of any purposeful systems are used to assess organizational-system output effectiveness (i.e., vertical suprasystem approval, horizontal suprasystem approval, achievement of purpose, and efficiency of the output process). This conceptualization of organizational effectiveness, it should be noted, contains elements from the two major approaches used in the study of organizational effectiveness. It is consistent with certain premises of the goal model because it places emphasis on goal attainment and recognizes that different groups will evaluate goal attainment differentially (see Hall, 1977). It is also sensitive to basic assumptions of the systems model. This conceptualization of organizational effectiveness takes external elements and opinions into account and recognizes the necessity of maintaining a favorable input/output ratio over time. The model of organizational effectiveness developed here, however, is not intended as a synthesis of these two approaches. Rather, it is offered as a third alternative that seeks to integrate organizational and extraorganizational aspects of effectiveness.
Various researchers (e.g., Kast and Rosenzweig, 1972; Kahn, 1977) have indicated that a joint consideration of these two aspects of effectiveness is necessary before further theoretical advancement of the construct can occur. In the following sections, each of the four effectiveness criteria are briefly discussed.

**Vertical suprasystem approval**  The vertical suprasystem of interest has been identified as the immediate superordinate administrative unit within the overall organizational structure. Vertical suprasystem approval can therefore be defined as the extent to which the identified vertical suprasystem finds the output of a component system acceptable. Organizational systems desire vertical approval and attempt to control the assessments of vertical suprasystems in order to ensure continued resources and autonomy.

This effectiveness criteria, like horizontal suprasystem effectiveness, represents an external frame of reference. A superordinate or otherwise more macroscopic system (i.e., a suprasystem) views the outputs of a component system (i.e., the focal system) as input material for its operations. Georgopoulos (1974) anticipates the importance of externally derived approval by noting that a major problem for organizations is the maintenance of good relations with the community and other interest groups. This is also supported by Hannan and Freeman's (1977: 121) contention that performance cannot always be measured internally to the organization. Finally, in addition to being consonant with GST principles, vertical suprasystem approval reflects the observation that different participant and constituent groups prefer different measures
of organizational effectiveness (Scott, 1977; Hannan and Freeman, 1977).

The recognition of external groups as evaluators of organizational effectiveness is more commonly approached as a type of horizontal suprasystem effectiveness.

**Horizontal suprasystem approval** The horizontal suprasystem of interest has been identified as the community in which the organizational unit of interest is located. The community is considered contiguous with the boundaries of the geographical-political division recognized as the county. Horizontal suprasystem approval can therefore be defined as the extent to which the identified horizontal suprasystem finds the output of a component system acceptable. Just as systems desire vertical approval, systems seek horizontal approval to guarantee continued resources and autonomy.

The most often recognized horizontal suprasystems in organizational literature are the community and the society. The original recognition of society as an ultimate evaluator of organizational output is attributed to Parsons and is implicit in his notion of a cybernetic hierarchy (Parsons, 1951; Parsons et al., 1953). Yuchtman and Seashore (1967:896) summarize the Parsonian perspective:

The *raison d'être* of complex organizations, according to this analysis, is mainly to benefit the society in which they belong, and that society is, therefore, the appropriate frame of reference for the evaluation of organizational effectiveness.

Under the Parsonian framework, the functional requisites (i.e., adaptation, goal attainment, integration, and latency) are frequently posited

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6 Interesting enough, Thompson (1967:88) alluded to this same issue and the potential problem of "incompatible yardsticks" over a decade ago.
as dimensions of organizational effectiveness (Hage, 1965; Sampson, 1973; Warren et al., 1975; Lyden, 1975). Increasing attention is also being rendered to the community as a horizontal suprasystem, vis-a-vis the organization. Kovener (1974) reports that who determines organizational goals and evaluates organizational performance is broadening. With respect to hospital organizations, such community-based advisory groups have expanded to include consumer groups, nonphysician employees, trustees, medical staff and administration. As these groups do have genuine power over the organization, according to Kovener, they must be satisfied in order for the organization to be deemed effective. In addition to formal interest groups or external constituencies, the community suprasystem can be equated with the general public or recipients of organizational outputs. Scott (1977:88) reports that such general clientele groups are likely to focus on outcome type measures of effectiveness and that they will evaluate the organization in terms of the extent to which it has met their own needs and expectations. It is therefore quite possible that the criteria employed by horizontal suprasystems for evaluating the level of effectiveness may be quite different from the criteria used by vertical suprasystems or by internal evaluators. We now turn to one of the internal effectiveness criteria, achievement of purpose.

**Achievement of purpose**

Achievement of purpose is defined as the extent to which the quality, quantity, and mix of a system's outputs are consistent with predetermined system objectives. In organizational analyses, this concept is frequently referred to as goal attainment.
Achievement of purpose is analogous to Berrien's (1968:117-118) concept of formal achievement, which is defined as the extent to which a system achieves expected tasks. Elsewhere he (1968:135) refers to formal achievement as the outputs which link one group to another.

All evaluations of system output involve some assumptions with respect to the frame of reference (Katz and Kahn, 1966:170). The previous two concepts, horizontal and vertical suprasystem approval of output, utilized an external frame of reference (i.e., the evaluator of output was not a member of the focal system). Achievement of purpose and efficiency of the output process, which follows, employ an internal frame of reference (i.e., the evaluator is a member of the focal system or is derived from data generated by the focal system).

The inclusion of achievement of purpose in this dissertation is based on the argument that while survival (i.e., approval by relevant suprasystems and efficiency) is an essential aspect of system output, it is insufficient for answering all the questions that might be asked concerning output. Achievement of purpose is more ordinarily defined in this research as goal attainment. There are several reasons beyond those generally identified with GST for including goal attainment as an effectiveness criteria. First and foremost, formal organizations are distinguished from other units of analysis precisely because they manifest goals (Blau and Scott, 1962). As Hannan and Freeman (1977:111) indicate, if we were "to drop goals from consideration, there would be no need for special theories of formal organizational structure and behavior." The inclusion of goal attainment as a type of organizational
effectiveness can also be justified on the basis that goal "products" are the primary exports of the organization. They signal the completion of the conversion process. Finally, goal attainment represents one of the most commonly used definitions (or aspects) of organizational effectiveness and thus it has previously demonstrated its stature as a useful concept (Price, 1968; Hannan and Freeman, 1977). On this basis alone, it merits inclusion in this research. The final effectiveness criteria is efficiency of the output process.

Efficiency of the output process

Efficiency of the output process is defined as the extent to which maximal output is achieved from a given level of input. This is consistent with Etzioni's (1964:8) definition of the concept as the "amount of resources used to produce a unit of output." Van Gigch (1974:173) refers to efficiency as the productivity of the conversion (or throughput) process. Katz and Kahn (1966:170) define efficiency as the ratio of energetic output to energetic input. In addition, they contend that efficiency describes how much of the input of an organization emerges as a product and how much is absorbed by the system. Efficiency is a necessary component of organizational effectiveness because it provides a vehicle for assessing the output of an organization relative to what it is capable of doing. It is similar to goal attainment in that both concepts employ an internal frame of reference and are a way of thinking about output. However, as Hall (1977) and others have clearly indicated, efficiency and goal attainment are not synonymous.

Thompson (1967) attaches great importance to the efficiency of
organizational functioning. He views the reduction of environmental uncertainty through buffering and leveling activities as "efficiency maintaining processes." Thompson defines efficiency as coordination of inputs, throughputs and outputs in conjunction with the environment and recommends that organizations evaluate their own fitness for future action by using efficiency measures. For him, efficiency measures are the strictest and most precise measures of effectiveness. Thompson's argument, when combined with the recognition of efficiency within GST, is sufficient to justify its incorporation as a criteria of effectiveness in this research.

Summary  This section on system output effectiveness has attempted to explicate GST principles to the organizational level and apply them to the study of organizational effectiveness. This explication process was followed because it is asserted that only "theory" can adequately separate determinants from results and that such a differentiation is sorely needed in organizational effectiveness research (see Scott, 1977). The subscription to a deductive model also reflects the researcher's desire to institute a "fine-grained analysis" of organizational effectiveness rather than the more typical "coarse-grained" examination (Weick, 1974). That is, Weick suggests that social scientists treat effects (dependent variables) more crudely than causes (independent variables). This seems particularly true in the area of organizational effectiveness.

It is also necessary to indicate how the four separate effectiveness criteria are to be handled in the forthcoming empirical analysis.
Within this chapter, the general and subgeneral hypotheses have been stated in terms of a single dependent concept, system output effectiveness. In actuality, each of these propositions represents a set of four propositions. Each reference to system output effectiveness should be interpreted as (a) vertical suprasystem approval, (b) horizontal suprasystem approval, (c) achievement of purpose, and (d) efficiency of the output process. To state each of these hypotheses explicitly would be both cumbersome and lengthy. Accordingly, theoretical matrices describing the 16 general hypotheses (i.e., hypotheses involving constructs) and the 56 subgeneral hypotheses (hypotheses involving concepts) are presented in Figures 2.4 and 2.5. The numbering sequence of the hypotheses follows that of the text, with the addition of lower case letters to indicate each of the four separate dependent concepts.

In the following final section of Chapter II, analysis techniques suitable to general and open systems thinking are discussed.

Analysis Techniques Appropriate to GST

Before proceeding to Chapter III, Methods, the present researcher feels that a discussion of analysis techniques appropriate to this research and the GST orientation, in general, is necessary. The incorporation of this material in Chapter II signifies the researcher's desire to achieve greater integration between theory and empirical analysis. While sociologists often decry the lack of genuine interdependence between theory and research, they seldom devote explicit attention to the problem of such integration. This section is offered in hopes of ameliorating
<table>
<thead>
<tr>
<th>Organizational Constructs</th>
<th>Vertical Suprasystem Approval</th>
<th>Horizontal Suprasystem Approval</th>
<th>Achievement of Purpose</th>
<th>Efficiency of Output Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Environment</td>
<td>Hyp. 1a</td>
<td>Hyp. 1b</td>
<td>Hyp. 1c</td>
<td>Hyp. 1d</td>
</tr>
<tr>
<td>Inputs</td>
<td>Hyp. 2a</td>
<td>Hyp. 2b</td>
<td>Hyp. 2c</td>
<td>Hyp. 2d</td>
</tr>
<tr>
<td>Throughputs</td>
<td>Hyp. 3a</td>
<td>Hyp. 3b</td>
<td>Hyp. 3c</td>
<td>Hyp. 3d</td>
</tr>
<tr>
<td>System Properties</td>
<td>Hyp. 4a</td>
<td>Hyp. 4b</td>
<td>Hyp. 4c</td>
<td>Hyp. 4d</td>
</tr>
</tbody>
</table>

Figure 2.4. Summary matrix of 16 general hypotheses (i.e., hypothesized relationships between system constructs and system output effectiveness)
System Output Effectiveness

<table>
<thead>
<tr>
<th>Organizational Concepts</th>
<th>Vertical Suprasystem Approval</th>
<th>Horizontal Suprasystem Approval</th>
<th>Achievement of Purpose</th>
<th>Efficiency of Output Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Environmental Uncertainty</td>
<td>Hyp. 1.1a</td>
<td>Hyp. 1.1b</td>
<td>Hyp. 1.1c</td>
<td>Hyp. 1.1d</td>
</tr>
<tr>
<td>Environmental Instability</td>
<td>Hyp. 1.2a</td>
<td>Hyp. 1.2b</td>
<td>Hyp. 1.2c</td>
<td>Hyp. 1.2d</td>
</tr>
<tr>
<td>Level of Skills</td>
<td>Hyp. 2.1a</td>
<td>Hyp. 2.1b</td>
<td>Hyp. 2.1c</td>
<td>Hyp. 2.1d</td>
</tr>
<tr>
<td>Level of Experience</td>
<td>Hyp. 2.2a</td>
<td>Hyp. 2.2b</td>
<td>Hyp. 2.2c</td>
<td>Hyp. 2.2d</td>
</tr>
<tr>
<td>Perceived Resource Support</td>
<td>Hyp. 2.3a</td>
<td>Hyp. 2.3b</td>
<td>Hyp. 2.3c</td>
<td>Hyp. 2.3d</td>
</tr>
<tr>
<td>Socialization</td>
<td>Hyp. 3.1a</td>
<td>Hyp. 3.1b</td>
<td>Hyp. 3.1c</td>
<td>Hyp. 3.1d</td>
</tr>
<tr>
<td>Communication</td>
<td>Hyp. 3.2a</td>
<td>Hyp. 3.2b</td>
<td>Hyp. 3.2c</td>
<td>Hyp. 3.2d</td>
</tr>
<tr>
<td>Commitment</td>
<td>Hyp. 3.3a</td>
<td>Hyp. 3.3b</td>
<td>Hyp. 3.3c</td>
<td>Hyp. 3.3d</td>
</tr>
<tr>
<td>Vertical Suprasystem Feedback</td>
<td>Hyp. 4.1a</td>
<td>Hyp. 4.1b</td>
<td>Hyp. 4.1c</td>
<td>Hyp. 4.1d</td>
</tr>
<tr>
<td>Horizontal Suprasystem Feedback</td>
<td>Hyp. 4.2a</td>
<td>Hyp. 4.2b</td>
<td>Hyp. 4.2c</td>
<td>Hyp. 4.2d</td>
</tr>
<tr>
<td>Negentropy</td>
<td>Hyp. 4.3a</td>
<td>Hyp. 4.3b</td>
<td>Hyp. 4.3c</td>
<td>Hyp. 4.3d</td>
</tr>
<tr>
<td>Internal Integration</td>
<td>Hyp. 4.4a</td>
<td>Hyp. 4.4b</td>
<td>Hyp. 4.4c</td>
<td>Hyp. 4.4d</td>
</tr>
<tr>
<td>Vertical External Integration</td>
<td>Hyp. 4.5a</td>
<td>Hyp. 4.5b</td>
<td>Hyp. 4.5c</td>
<td>Hyp. 4.5d</td>
</tr>
<tr>
<td>Horizontal External Integration</td>
<td>Hyp. 4.6a</td>
<td>Hyp. 4.6b</td>
<td>Hyp. 4.6c</td>
<td>Hyp. 4.6d</td>
</tr>
</tbody>
</table>

Figure 2.5. Summary matrix of 56 subgeneral hypotheses (i.e., hypothesized relationships between system concepts and system output effectiveness)
this situation and sensitizing others to the need to deal with these issues.

In many ways, the theoretical development of GST surpasses the empirical evidence available to support its tenets. Many (e.g., Buckley, 1967:67) feel that the empirical evaluation of GST is impeded because of a lack of methodological "sophistication." Kast and Rosenzweig (1972:458), for example, state:

One of the major problems is that the practical need to deal with comprehensive systems of relationships is overrunning our ability to fully understand and predict these relationships. We *vitaly need the systems paradigm but we are not sufficiently sophisticated to use it appropriately.*

These researchers are distressed because some of the most common and easily understood analysis techniques (e.g., linear regression) require assumptions that appear incompatible with theoretical notions about systems (e.g., the assumption of minimal multicollinearity among independent variables seems unreasonable in a perspective which emphasizes mutual causality and interdependence). However, as Sutherland (1975) and others have pointed out, in moderately stochastic systems (like organizations), some simplifying assumptions can be made without serious violation of the theoretical principles. In the case of linear regression and related techniques, the primary assumption is that we can isolate real-world phenomena that are linear in design, and whose future state is likely to be a product of its past states (Sutherland, 1975:172).

This assumption seems to be reasonable in the case of organizational systems. At a given point in time, system output effectiveness is likely to be a function of environmental factors, inputs, throughputs, and
system properties. The assumption of linearity, as well as other statistical postulates, can be evaluated for evidence of serious violations. Accordingly, correlation and multiple correlation-regression are identified as appropriate analysis techniques for the assessment of the hypotheses developed in this chapter. These two techniques are thought to manifest several additional benefits:

1. They are readily understood in the scientific community and therefore promote communication, replication, etc.

2. They are useful for both descriptive and inferential purposes. Multiple regression is particularly useful in unraveling complex multivariate relationships and in summarizing the linear dependence of one variable on others (Nie et al., 1975:321).

3. Should the key assumption of linearity be significantly violated, both correlation and regression are associated with non-linear analogue techniques (e.g., correlation ratio, polynomial regression) which are readily interpretable and appropriate for evaluation of the general hypotheses. This advantage is important in that there is some theoretical evidence to suggest that certain system variables (e.g., negentropy, feedback) may be curvilinearly related to system output effectiveness (Kahn, 1977: 246). At any rate, researchers need to be more sensitive to the possibility of non-linear relationships and be prepared to deal with them.

4. Finally, correlation and multiple regression are said to be robust statistical tests which can still be used in situations where underlying assumptions are not completely met (Bohrnstedt and Carter, 1971; Borgatta and Bohrnstedt, 1972; Warren et al., 1977). This increases the likelihood of their appropriateness in the present research. In addition, zero order correlation and multiple regression can now be adjusted for measurement error.

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For example, in the discussion on negentropy, it was noted that very low turnover could be dysfunctional in terms of system output effectiveness. It is also possible for too much feedback from a suprasystem to result in information overload and ultimately lower system output effectiveness.
The assumptions of correlation and multiple correlation-regression are more fully discussed in Chapter III. The writer would, however, like to conclude this chapter with a brief discussion of causality and causal modeling techniques in open systems analyses.

The issue of causality has been and continues to be a problematic topic in open systems thinking. This is true even when a more probabilistic or "relaxed notion of causality" is adopted (Abell, 1971:116). The particularly thorny points involve the principles of equifinality (how different initial conditions lead to similar end effects), multifinality (how similar initial conditions lead to different effects), and feedback. These principles run counter to conventional causal thinking (e.g., "like causes, like effects", or "where there is difference in the effect there is difference in the cause"—Buckley, 1967:78). At present, there is no consensus regarding how causality should be handled in open systems thinking. Some (e.g., Pondy, 1977) suggest we develop new images of causality such as mutual or cybernetic causality while others (e.g., Hage, 1974) sidestep the issue and talk about such processes as "cybernetic control". Dubin (1975) makes the rather startling suggestion that the conventional notion of causality can be supplanted by the systems analytical approach. Dubin bases his recommendation on the argument that the understanding of a system, a set of interdependent parts, does not entail the use or substance of causal language. Bates and Harvey (1975) reach the same conclusion in their discussion of causality and the systems orientation. They (1975:31) stress that it is the way the elements of a system are organized in relation to each other that accounts
for the events occurring within the system, and between it and its environment:

In the systems approach there are no dependent and independent variables. There are no causes or sets of causative factors. There is, instead, simultaneous universal responsiveness among parts, so that they act together as an unfolding operation of parts functioning in relation to one another as a whole.

Unfortunately, sociologists sometimes tend to use causal language to express what they claim to be system relationships. This usage should be avoided, since it weakens both approaches by mixing two sets of assumptions about the operation of the entities being described.

In other words, Bates and Harvey assert that it is the way systems are put together that determines how they operate. The problem with this outlook on causality is that it offers no assistance concerning how one should study causal relations within a system. Hence, the understanding of the complex relations among system parts is likely to take a long time and engender considerable debate. For example, the ambiguity over causality in open systems has stimulated controversy over the appropriateness of causal modeling techniques, including path analysis.

The use of path analysis is specifically rejected as inappropriate for this research, despite its unique suitability for examining the interrelationships and relative contributions of variables within a theoretically prescribed model. This rejection is based on the inability of the present research design to fulfill several of the fundamental assumptions of the path analytic technique. One such assumption of path analysis is that all of the relevant variables have been theoretically identified and included in the model (Faisal, 1978:433). It has already been established, through the use of constructs rather than concepts in the
formulation of the open systems model of organizations, that all of the relevant variables have likely not been identified. In addition, to assign the antecedent variables identified in this model as causal variables would likely constitute an instance of "premature intellectual closure" (Dubin, 1975:108). As Dubin points out, once a variable has been anointed with the label "causal", it becomes difficult to consider the possibility that other variables may be substituted for, or added to the so-called causal variable in an explanation of a given outcome variable (i.e., recall the principle of equifinality). At a more pragmatic level, the use of constructs also creates problems; there is no clear technique for obtaining a single path coefficient to represent a block of variables (Heise, 1972). Another assumption of path analysis that this research cannot meet concerns the causal ordering of variables. Heise (1969:52) states that the causal laws governing the system must be sufficiently established to specify the causal priorities undebatably. The current state of both open systems and organizational effectiveness research does not warrant such an assumption. Numerous references have been made to the problem of separating determinants from dimensions of organizational effectiveness. Hannan and Freeman (1977:122) describe the situation as follows:

All of the variables that appear in the conventional [organizational effectiveness] analyses are endogenous, that is, causally dependent on other variables in the model. For example, the quality of inputs may be a function of the expenditure on inputs, which is a function of output performance. If none of these factors is causally prior, or exogenous, it is extremely difficult to obtain unique estimates of any relevant causal effects in the system. In the technical language
of econometrics, the system is underidentified. To remedy this situation one must make a considerable number of strong assumptions concerning the details of the causal structure. Unfortunately, the existing theories of organizational performance (and effectiveness) do not provide for these assumptions.

While the present writer is hopeful that determinants of organizational effectiveness can ultimately be separated from results, within an open systems framework, she is not sufficiently confident to subject the entire hypothesized model to the rigors of a path analytic examination. Other assumptions of path analysis are also potentially problematic (e.g., no causal feedback or reciprocal causation, high reliability of measures) but are not without possible solutions (e.g., two-stage models, longitudinal data, adjustments for measurement error). It is anticipated that once the majority of relevant variables associated with organizational effectiveness are identified and causally ordered, path analysis will become the preferred analysis technique. In the meantime, it is hoped that longitudinal assessments which reflect the key results of this study will be conducted and used to advance our understanding of the causal priorities associated with organizational effectiveness variables.

Chapter III describes the research procedures that will be employed in examining the hypotheses developed in this chapter.
CHAPTER III. METHODS

The purpose of this chapter is to discuss the research procedures used to evaluate the hypotheses developed in Chapter II. The chapter is organized into four sections: (1) data sources and collection procedures, (2) variable measures, (3) analysis strategy, and (4) statistical procedures.

Data Sources and Collection Procedures

Research related to organizational effectiveness has involved nearly every type of organizational classification. It is perhaps one of the few areas of organizational inquiry where both profit and non-profit enterprises have received similar attention. This dissertation focuses on a group of publicly-supported educational organizations, the county Extension Service organizations of Iowa. These county-level organizations are part of the Iowa Cooperative Extension Service and constitute the empirical unit of analysis in this research. Because they are affiliated with the larger Iowa Cooperative Extension Service, some may prefer to view the county-level organizations as organizational subunits rather than as autonomous organizations. It has been asserted, however, that these county units are more similar to organizations than organizational subunits.

The legislated purpose of Extension Service organizations is "to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics,
and to encourage the application of the same" (excerpt from Smith-Lever Act, Cooperative Extension Service, Iowa State University, 1976). The Iowa Cooperative Extension Service, like most state-level Extension organizations has expanded the mission of the organization to also include youth and community development activities. As an organization, then, Extension Service units can be classified as educational organizations. From a systems perspective, their output is identified as educational services (i.e., educational and programming activities designed to transmit information). Attention is now directed toward the acquisition of the empirical data.

Data used in this dissertation were collected by the Department of Sociology and Anthropology at Iowa State University, Ames, Iowa, with the cooperation of the Iowa Cooperative Extension Service. The project was supported by funds from the Iowa State Agricultural Experiment Station, Project 2271, and is a component of a larger project supported by the U.S. Department of Agriculture Extension Service. The primary objective of this larger project was to develop conceptual models for evaluating the effectiveness and impact of Extension Service organizations (Mulford et al., 1976). The component project as well as the larger research effort were directed by Drs. Charles L. Mulford, Richard D. Warren, Gerald E. Konglan and Ronald C. Powers. Other project staff members were William D. Lawson, Paula C. Morrow and Lacey M. Tillotson.

Data for the present study were obtained on 100 county Extension Service organizations in the state of Iowa. A variety of information sources and data collection techniques were used. Primary data was
secured from County Extension Directors (CEDs) and County Extension Council Chairman (CCECs) via a mailed questionnaire and from Area Extension Directors (AEDs) through a group administered questionnaire. Secondary data sources included Census information related to each county and Extension Service records.

The County Extension Director was selected as a data source because of his position as chief administrative official at the county level. This position provides the incumbent with a broad knowledge base in which to represent the county staff's perception of Extension operations. The decision to collect data from CCECs reflected a desire to incorporate perceptions of Extension operations from the county residents' point of view. The Chairman was judged to be a knowledgeable source of county residents' perceptions related to Extension because of his elected position on the Council. The AEDs were selected as a data source because of their familiarity with the state level Extension organization and because of their responsibility for coordination of Extension programs within a specified jurisdiction. AEDs also represent a unique perspective in that they act as mediators between state and county-level Extension organizations. The questionnaire schedules for the CEDs, CCECs and AEDs are available in Appendix A. In addition to the primary data, supplemental data was obtained from secondary sources. Extension records were consulted in order to obtain data related to the average educational attainment, experience, and tenure of professional county staff. Demographic characteristics associated with each county in 1960 and 1970 were secured from Census records.
In the following subsections the processes of instrument develop­
ment and administration of the questionnaires used in this study are de­
scribed. The final response rates associated with each questionnaire
are also reported.

Development of the instruments

Since a great deal of the data used in this study were acquired
through the use of questionnaires, special efforts were made to develop
valid and reliable instruments. Successive drafts of each questionnaire
were formulated by project staff during September and October, 1977.
These preliminary versions were critiqued by various individuals includ­
ing academic sociologists, Extension sociologists, and members of Ex­
tension administration. Several participants in this informal pre­
testing effort were former CEDs and AEDs. In November, 1977, final ver­
sions of the CED and CECC instruments were formally pretested by ask­
ing a current CED and CECC to complete the questionnaire. Two members
of the project staff personally administered the questionnaires and then
discussed the instruments with the respondents. The respondents indi­
cated that the questionnaires were not difficult to understand and that
the information being requested appeared reasonable. Only minor revi­
sions resulted from this final pretesting exercise.

Administration of the questionnaires

Once the content and arrangement of the three questionnaires were
established, a summary outline of each of the questionnaires was sub­
mitted to the Iowa State University Human Subjects Committee for its
approval. This was to insure that the questionnaires would not violate the rights of the respondents. After the approval of this committee was granted, the researchers directed their efforts toward maximizing the completion and return of the mailed questionnaires (i.e., CED and CECC instruments). Various researchers have noted that mailed questionnaires are susceptible to low return rates and subsequent problems in sampling methodology (Kerlinger, 1973). Examination of past research and literature related to the mailed questionnaire survey technique yielded several suggestions for increasing response rates. Linsky (1975), for example, makes ten recommendations for stimulating response rates. Seven of these were incorporated into this research:

1. Pre-contacting subjects - accomplished by letter to AEDs, CEDs and CECCs from Extension administrators (available in Appendix A).
2. Preliminary letters which personalize researcher - accomplished by letter to CEDs and CECCs from project staff (available in Appendix A).
3. Follow-up devices (e.g., postcards, replacement questionnaires, etc.) - see discussion of instrument administration below.
4. Attractive packaging of questionnaires - accomplished via booklet type format and eye-catching cover page.
5. Use of number identification rather than respondent name.
6. Personalized cover letters sent with questionnaire - accomplished by individual typing of respondent addresses and original, inked signature (available in Appendix A).
(7) Evidence of sponsorship by a relevant organization - accomplished by use of official Extension Service and Department of Sociology letterhead stationery and endorsement from high ranking Extension leaders.

While the data collection effort was able to assure respondents of confidentiality, it could not incorporate Linsky's recommendations for respondent anonymity, handstamping of correspondence, and offer of cash rewards to participants. Other suggestions, such as the use of blue ink in signatures, were also adapted (Dillman, 1972).

As a consequence of incorporating the suggestions advanced by Linsky and Dillman, an unusually high response rate (96.5%) was achieved. Kerlinger (1973:414) has indicated that mailed questionnaire returns of less than 40 or 50 percent are common and higher percentages are rare. Listed below is a breakdown of the response rate by waves of returns and the follow-up procedure undertaken at the conclusion of each wave to encourage the completion and return of the remaining questionnaires.

(1) First Mailing - December 5, 1977

Wave 1 - Concluded December 16, 1977

Responses: 64 CEDs
52 CECCs
116 (58% of target; 58% cumulative total)

Action to facilitate return: Reminder Postcards - December 16, 1977

(2) Wave 2 - Concluded December 28, 1977

Responses: 22 CEDs
33 CECCs
55 (27.5% of target; 85.5% cumulative total)
Action to facilitate return: Reminder letters and Replacement Questionnaires - December 28, 1977

(3) Wave 3 - Concluded January 6, 1978

Responses: 5 CEDs
5 CECCs
10 (5% of target; 90.5% cumulative total)

Action to facilitate return: Telephone calls - January 9, 1978

(4) Wave 4 - Concluded January 20, 1978

Responses: 7 CEDs
5 CECCs
17 (6% of target; 96.5% cumulative total)

Action to facilitate return: None

(5) Final Sample: 98 CEDs
95 CECCs
193 (96.5% of target; 96.5% cumulative total)

Special efforts were also made to encourage the completion of all of the AED questionnaires particularly since the number of potential respondents was small (N=12). Letters of introduction and endorsement from Extension administrators and project coordinators (available in Appendix A) were mailed to AEDs in early December, 1977 to gain their support for the entire data collection effort and to solicit their cooperation in the subsequent AED questionnaire completion. The AEDs were asked to complete the questionnaires during their February staff meeting on the Iowa State University campus. All of the AEDs agreed to complete the questionnaires and were briefed by project staff prior to the administration of the instruments concerning the objectives of the research project. During the administration of the instrument, the AEDs were permitted and encouraged to ask questions about any items that they did not fully understand.
After taking into account all of the data sources (i.e., CEDs, CECCs, AEDs, Census and Extension records), the researchers were able to obtain a complete set of information, excluding missing values on some variables, for ninety of the one hundred County Extension Service organizations in Iowa.

In the next section, variables acquired through this data collection process are described.

Variable Measures

This section will explain how each of the eighteen dissertation variables is measured. As this research emphasizes the explication of GST principles to organizational inquiry, the achievement of isomorphy between conceptual definitions and measures is emphasized. The present writer is not aware of any previously developed organizational measures designed to be directly consonant with GST. Accordingly, the measures developed and presented here are original with this research.

Variables will be discussed in the order followed in Chapter II. Each construct classification is first identified and the general hypothesis associated with it is restated at the empirical level. The concepts and their variable measures are then described. The operational definition, description of the items used to build the indicator, scoring information, and range data are reported for each variable. Means, standard deviations, and other descriptive statistics for each variable are available in Appendix B. At the conclusion of the discussion of each independent variable, the subgeneral hypotheses described in
Chapter II are restated at the empirical level. As before, each of the hypotheses incorporates four types of system output effectiveness. A tabular summary of the 16 general and 56 subgeneral empirical hypotheses is provided at the end of this section.

Organizational environment

The environment of an organizational system pertains to elements outside of its boundaries. It is hypothesized to be related to system output effectiveness:

E.H. 1: The set of environmental variable scores is related to system output effectiveness scores.

**Perceived environmental uncertainty** Perceived environmental uncertainty was defined as the extent to which the environment is perceived as complex and unpredictable. It is operationally defined as the extent to which a County Extension Director believes he has inadequate information for decision-making and does not know what to expect from people and organizations in his county. Directors were asked to estimate the frequency of the following conditions:

(1) How often do you believe that the information you receive from area and state Extension staff is sufficient for decision-making?

(2) How often do you believe that the information you have about your county is sufficient for decision-making?

(3) How often do you know what to expect in your dealings with other people or organizations in the county?

The scoring framework for each item used can be described as an eleven-point rating scale with descriptive anchors of (1) "Rarely", (5, 6, 7) "Occasionally", and (11) "Frequently". Items were coded such that a
A high score was indicative of high uncertainty. A single composite score for each case was formed by averaging the responses to these three items and thus produced a measure with a possible range of 1 to 11. The actual range was 1.667 to 8.333. The empirical hypothesis can now be stated:

E.H. 1.1: Perceived environmental uncertainty scores are negatively related to system output effectiveness scores.

Environmental instability was defined as the degree of turnover in environmental elements. Operationally, such turnover can be defined as (1) the absolute percent change in county population over a ten-year period and (2) the absolute percent change in county population under 18 years of age over a ten-year period. Empirical measures for these two aspects of environmental instability were secured from Census records and reflect the decade between 1960 and 1970 (U.S. Bureau of Census, 1960; 1970). A single instability score for each case was calculated by averaging the two percent change scores. The actual range of instability scores was .670 to 32.58 with a higher score indicative of greater environmental instability. As this index is not readily interpretable it may be useful to describe those counties representing the low and high end of the index. The county with an instability score of .670 had a population of 15,034 in 1960 and 14,969 in 1970. County population under 18 years of age was also very stable: 5731 in 1960 and 5783 in 1970. The county with a high instability score housed a population of 20,829 in 1960 which increased to 27,432 in 1970. A similar increase over the decade was observed in population under 18:
7,798 in 1960 and 10,408 in 1970. While this particular county manifested a high instability score because of its substantial growth, it should be noted that other counties achieved high instability through a marked decline in population and/or change in population distribution. The empirical hypothesis involving environmental instability is:

E.H. 1.2: Environmental instability scores are negatively related to system output effectiveness scores.

Inputs

The inputs associated with an organizational system have been described as energies and information ingested by a system. Inputs are hypothesized to be related to system output effectiveness:

E.H. 2: The set of input variable scores is related to system output effectiveness scores.

Level of skills Level of skills was ordinarily defined as the average level of educational attainment among organizational subunit members. This concept was operationalized by the formation of an average educational attainment index for professional Extension staff in each county. The index was constructed in the following manner: On the basis of highest college degree earned, each staff member was assigned an educational attainment score. The following scoring framework was used: "1" = no degree, "2" = B.A. or B.S. degree, "3" = M.A. or M.S. degree, and "4" = Ph.D. degree. These values, which were obtained from Extension records, were then summed for the staff in each county and divided by the number of staff positions scored. This measurement procedure resulted in a single average educational attainment score for each county, with higher scores indicative of higher educational attainment. The
theoretical range for this single item measure was 1.00 to 4.00, with an actual range of 2.00 to 3.00. The empirical hypothesis involving level of skills can now be stated:

E.H. 2.1: Level of skills scores are positively related to system output effectiveness scores.

Level of experience Level of experience was said to refer to the tenure of organizational members. A single item indicator of tenure (i.e., length of employment) among Extension county staff was obtained from Extension records and is considered the operational definition of level of experience. The tenure measure consisted of the average number of months of employment associated with the professional staff in each county, divided by a constant of 10. The division was incorporated in order to make the observed variance of this measure more comparable to other observed variances. The resultant measure had a theoretical range of 0 to infinity and an actual range of 1.000 to 29.450. Higher scores are associated with longer periods of tenure among county staff. The empirical hypothesis related to the level of experience is:

E.H. 2.2: Level of experience scores are positively related to system output effectiveness scores.

Perceived resource support Perceived resource support was defined as the degree to which forms of support other than staff skill and experience are believed available to the organization. It is operationally defined as the extent to which a County Extension Director believes that his County Extension Service has a sufficient amount of resources to fulfill its mission. Each director was asked to indicate the extent to which his County Extension Service has a sufficient amount of the
following resources:

(1) Finances?
(2) Professional Extension personnel?
(3) Volunteer leaders?
(4) Office (secretarial) personnel?
(5) Office space?
(6) Equipment?
(7) General allocation of resources (time, money, equipment, etc.)?

The scoring framework associated with each of these items consisted of an eleven-point rating scale with descriptive anchors of (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To a very great extent". Items were coded such that a high score meant a high level of perceived resource support. A single composite score was formed for each case by averaging the responses to these seven items and thus resulted in a measure with a theoretical range of 1 to 11. The actual range was 4.429 to 11.000. The empirical hypothesis can now be stated:

E.H. 2.3: Perceived resource support scores are positively related to system output effectiveness scores.

Throughputs

The throughputs of an organizational system pertain to the structural arrangements and processes whereby inputs are converted into outputs. Throughputs are hypothesized to be related to system output effectiveness.

E.H. 3: The set of throughput variable scores is related to system output effectiveness scores.
Socialization

Socialization was ordinarily defined as the perceived adequacy of job orientation and training. It is operationally defined as the extent to which a County Extension Director feels that the job orientation for new staff and routine training for all staff is adequate. Socialization is globally assessed for all field staff, rather than just for the single county-system, because socialization activities are conducted on a state level basis. Directors were asked the following two questions concerning socialization activities:

1. How adequate is the orientation provided to new Extension field staff?
2. How adequate is the staff training for updating skills and abilities and for informing field staff about new goal priorities and new procedures?

The scoring framework consisted of an eleven-point rating scale with descriptive anchors of (1) "Rather inadequate", (5, 6, 7) "Adequate", and (11) "More than adequate". Items were coded such that a high score was indicative of high (i.e., highly adequate) socialization. A socialization index was obtained by averaging the responses to these two items into a single composite score for each case. The theoretical range was 1 to 11 while the actual range was 1.500 to 11.000. The empirical hypothesis related to socialization is:

E.H. 3.1: Socialization scores are positively related to system output effectiveness scores.

Communication

Communication was said to refer to the extent to which organizational members exchange job-related ideas, opinions, and information. It is operationally defined as the extent to which a County Extension Director perceives that field staff in his county
communicate with each other. Communication was measured by the following two items:

(1) To what extent do staff members in your County Extension Service interact with each other in their daily Extension activities?

(2) To what extent do staff members in your County Extension Service exchange information about what is going on in their program areas?

Both of these items were scored using an eleven-point rating scale containing descriptive anchors of (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To a very great extent". A single composite score was formed for each case by averaging the responses to these two items and thus produced a measure with a possible range of 1 to 11. The actual range was 2.000 to 11.000, with higher scores indicative of greater communication levels. The empirical hypothesis involving communication can now be stated:

E.H. 3.2: Communication scores are positively related to system output effectiveness scores.

Commitment Commitment was defined as the extent to which organizational members desire to remain in, meet the goals of, and expend high levels of effort for the organization. Operationally, it is defined as the extent to which a County Extension Director believes that field staff in his county are committed to the county unit. Six items were used to measure the variable. County Extension Directors were asked: To what extent do staff members in your county

(1) Exhibit a sense of pride in working for the Extension Service in this county?

(2) Exhibit a feeling that the County Extension Service's problems are their problems?
(3) Exhibit a willingness to work over-time?

(4) Exhibit a strong desire to stay with the Extension Service in this county?

(6) Exert high levels of effort on behalf of the County Extension Service beyond minimal job expectations?

The scoring framework associated with these items consisted of an eleven-point rating scale with descriptive anchors of (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To a very great extent". A commitment index was formed by averaging the responses to the six items into a single summary score for each case. The theoretical range was 1 to 11 and the actual range was 5.667 to 11.000. A high score on the commitment index indicates high levels of commitment among county staff.

The empirical hypothesis involving commitment can now be stated:

E.H. 3.3: Commitment scores are positively related to system output effectiveness scores.

System properties

System properties were identified as analytical characteristics of organizational systems which describe the system holistically. These properties are hypothesized to be related to system output effectiveness:

E.H. 4: The set of system property variable scores is related to system output effectiveness scores.

Vertical suprasystem feedback

Vertical suprasystem feedback was defined as the extent to which a specified vertical suprasystem relates useful information pertaining to system output back to the focal system. The vertical suprasystem of interest in this research is identified as the area Extension office. Accordingly, vertical suprasystem feedback
can be ordinarily defined as the extent to which a County Extension Director perceives that his county unit receives useful information pertaining to County Extension activities from the Area Extension Director. County Extension Directors were asked to respond to the following questions:

(1) How frequently do you get together with your Area Extension Director to hear his or her evaluations and suggestions for improving County Extension programs?

(2) How frequently do other staff members in your County Extension Service get together with your Area Extension Director to hear his or her evaluations and suggestions for improving County Extension programs?

(3) To what extent have evaluations and suggestions offered by your Area Extension Director led to changes and improvements in Extension programs conducted in your county?

(4) To what extent can you depend on your Area Extension Director to provide county staff with constructive comments and feedback on Extension activities in your county?

The response frameworks associated with each of these items consisted of eleven-point rating scales. The first two items utilized descriptive anchors of (1) "Rarely-annually" and (11) "Very frequently-monthly." The last two items were characterized by anchors of (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To a very great extent." All four items were scored in the same manner (i.e., 1 to 11). A single composite score for each case was formed by averaging the responses to these items, producing a theoretical range of 1 to 11. The actual range was 1.250 to 10.500. A high score on this index means a high level of vertical suprasystem feedback. The empirical hypothesis involving this variable is:
E.H. 4.1: Vertical suprasystem feedback scores are positively related to system output effectiveness scores.

**Horizontal suprasystem feedback** The ordinary and operational definitions of horizontal suprasystem feedback are similar to those described above for vertical suprasystem feedback, except for the suprasystem identified. The horizontal suprasystem of interest is defined as the encompassing community in which the county Extension unit is located. Horizontal suprasystem feedback is thus operationally defined as the extent to which a County Extension Director perceives that his county unit receives useful information pertaining to county Extension activities from county clientele and the Extension Council. This concept was measured by the following five items asked of the County Extension Director:

1. How frequently do you or other staff members in your County Extension Service get together with the Extension Council to hear their evaluations and suggestions for improving County Extension programs?

2. How frequently do you or other staff members in your County Extension Service get together with county clientele, including volunteer 4-H leaders, producer groups, homemaker groups, etc., to hear their evaluations and suggestions for improving County Extension programs?

3. To what extent have evaluations and suggestions offered by county clientele led to changes and improvements in Extension programs conducted in your county?

4. To what extent have evaluations and suggestions offered by your County Extension council led to changes and improvements in Extension programs conducted in your county?

5. To what extent can you depend on your Extension Council to provide county staff with constructive comments and feedback on Extension activities in your county?

Each item employed an eleven-point rating scale response framework. The
first two item frameworks contained descriptive anchors of (1) "Rarely-annually" and (11) "Very frequently-monthly". The remaining items utilized the (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To a very great extent" response framework. All items were scored in the same manner (i.e., 1 to 11). A single composite score for each case was formed by averaging the responses to these items. The resultant index had a theoretical range of 1 to 11 and an actual range of 3.000 to 10.400. A high score should be interpreted as a high level of horizontal suprasystem feedback. The empirical hypothesis can now be stated:

E.H. 4.2: Horizontal suprasystem feedback scores are positively related to system output effectiveness scores.

Negentropy

Negentropy was ordinarily defined as an organizational system's ability to conserve energy by reducing personnel turnover. In contradistinction to many of other measures designed in this research, many turnover measures exist. These include measures of average length of service, crude turnover rates, stability-instability rates, and survival-wastage rates (Price, 1977). Although there is a certain lack of precision associated with the crude separation rate, Price recommends this measure as the best single indicator of turnover. Accordingly, it was selected for this research. The crude separation rate was calculated from data available in Extension personnel records and consisted of the number of county staff who left during a three-year period divided by the average number of budgeted staff positions existing during the same period. This rate has a theoretical minimum of 0, indicating no turnover during the three-year interval, and an indefinite maximal value. The actual range was 0.000 to 2.000. The crude separation rate
turnover score is thus a single-item measure with higher scores indicative of higher turnover. This interpretation, however, runs counter to the theoretically established meaning of negentropy; high negentropy is associated with low turnover. Accordingly, turnover scores are re-coded such that a high score means low turnover and high negentropy. The empirical hypothesis can now be stated:

E.H. 4.3: Negentropy scores are positively related to system output effectiveness scores.

**Internal integration** Internal integration was defined as the degree of agreement on values and mutual interdependence among members of an organizational system. It is operationally defined as the extent to which a County Extension Director perceives that the staff in his County Extension Service agree on programs and clientele needs and are interdependent. Directors were asked to what extent do staff members in your County Extension Service:

(1) Agree on what sorts of programs will best meet clientele needs?

(2) Agree on clientele needs?

(3) Plan together and coordinate their efforts where it is feasible?

(4) Encourage each other to work as a team on projects of mutual concern?

The scoring framework associated with these items consisted of an eleven-point rating scale with descriptive anchors of (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To a very great extent". An internal integration index was formed by averaging the responses to the four items into a single summary score for each case. The
theoretical range was 1 to 11 and the actual range was 2,500 to 11,000. Higher scores indicate higher levels of internal integration. The empirical hypothesis involving internal integration is:

E.H. 4.4: Internal integration scores are positively related to system output effectiveness scores.

**Vertical external integration**

Vertical external integration was said to refer to the degree of agreement on values and mutual interdependence between members of an organizational system and a specified vertical suprasystem. The vertical suprasystem of interest has been established as the area Extension office. Accordingly, vertical external integration can operationally be defined as the extent to which a County Extension Director perceives that his county staff and area level staff are mutually receptive to each others ideas, coordinate their work, and agree on needs and goals. Directors were asked the following questions:

1. To what extent are staff members in your County Extension Service receptive to new ideas and suggestions offered by your Area staff?

2. To what extent are area level staff receptive to suggestions and ideas offered by staff members in your County Extension Service?

3. To what extent do area level staff provide enough information and technical assistance for staff members in your County Extension Service to do the best job possible?

4. To what extent do staff members in your County Extension Service plan activities and coordinate their efforts with Area staff?

5. To what extent do staff members in your County Extension Service agree with Area staff on clientele needs?

6. To what extent do staff members in your County Extension
Service agree with Area staff on goals that the County Extension Service ought to pursue?

The response and scoring frameworks for items 1, 4, 5, and 6 consisted of an eleven-point rating scale with the descriptive anchors of (1) "To a very little extent", (5, 5, 7) "To some extent", and (11) "To a very great extent." Items 2 and 3 employed the eleven-point framework but were characterized by different anchors. Item 2 used (1) "Non-receptive", (5, 6, 7) "Sometimes receptive", and (11) "Nearly always receptive." Item 3 employed (1) "Difficult to get help" and (11) "Can always get help from specialists." A vertical external integration index was formed by averaging the responses to these six items into a single summary score for each case. The theoretical range of this index is 1 to 11. The actual range was 5.333 to 10.833. A higher score on this index means a higher level of vertical external integration. The empirical hypothesis associated with this variable can now be stated:

E.H. 4.5: Vertical external integration scores are positively related to system output effectiveness scores.

Horizontal external integration Horizontal external integration was said to refer to the degree of agreement on values and mutual interdependence between members of an organizational system and a specified horizontal suprasystem. The horizontal suprasystem of interest has been identified as the community surrounding the County Extension unit. Horizontal external integration can thus be operationally defined as the extent to which a County Extension Director perceives that his county staff and county clientele, including the Extension Council, are mutually receptive to one another's ideas, coordinate their activities, and agree
on needs and goals. County Extension Directors were asked to answer the following questions related to horizontal integration:

1. To what extent are staff members in your County Extension Service receptive to new ideas and suggestions offered by your County clientele?

2. To what extent are staff members in your County Extension Service receptive to new ideas and suggestions offered by your County Extension Council?

3. To what extent is your Extension Council receptive to new ideas and programs developed by staff members in your County Extension Service?

4. To what extent does your Extension Council have enough knowledge of county clientele to help your county staff recognize and interpret clientele needs and interests?

5. To what extent does your Extension Council provide information and make suggestions concerning clientele needs and interests?

6. To what extent does your Extension Council agree with staff members in your County Extension Service on the types of activities and programs that the County Extension Service should develop and implement?

7. To what extent does your Extension Council agree with staff members in your County Extension Service on the goals that the County Extension Service ought to pursue?

8. To what extent does your Extension Council agree with staff members in your County Extension Service on priority clientele groups?

9. To what extent do clientele in your county agree with staff members in your County Extension Service on the types of activities and programs that the County Extension Service should develop and implement?

10. To what extent do clientele in your county agree with staff members in your County Extension Service on the goals that the County Extension Service ought to pursue?

11. To what extent are county clientele receptive to new ideas and programs developed by staff members in your County Extension Service?
The response and scoring frameworks for items, 1, 2, and 4 through 10 employed the standard eleven-point rating scale with anchors of (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To a very great extent." Items 3 and 11 used the eleven-point format but were characterized by anchors of (1) "Non-receptive", (5, 6, 7) "Sometimes receptive", and (11) "Nearly always receptive." A horizontal external integration index was formed by averaging the responses to these eleven items into a single summary score for each case. The resultant index had a theoretical range of 1 to 11 and an actual range of 5.000 to 10.636. A high score should be interpreted as a high level of horizontal external integration. The empirical hypothesis involving this variable can now be stated:

**E.H. 4.6: Horizontal external integration scores are positively related to system output effectiveness scores.**

**System output effectiveness**

System output effectiveness has been defined as the degree to which a system receives approval from relevant suprasystems, achieves its purposes, and is efficient. This section describes the variable measures of system output effectiveness.

**Vertical suprasystem approval** Vertical suprasystem approval was defined as the extent to which an identified vertical suprasystem, in this case, the area Extension office, finds the output of a component system acceptable. The component system of interest is the county Extension organization. Accordingly, vertical suprasystem approval can be operationally defined as the extent to which the Area Extension Director
approves of county Extension organization operations and performance.

Each Area Director was asked to answer the following set of questions for each county office within his jurisdiction:

(1) To what extent do each of the following counties do a good job in providing programs which meet clientele needs?

(2) To what extent have each of the following county units been able to gain the respect and public support of county residents for county Extension programs?

(3) To what extent should the area office have more input into program development in each of the following counties?

(4) To what extent should the area office have more input into the budgeting process in each of the following counties?

(5) To what extent should the area office have more input into the selection of priority audiences in each of the following counties?

(6) Given your special knowledge of the Extension units in your area, please rate each of the following county units with respect to their overall performance:

The response framework for items 1-5 consisted of an eleven-point rating scale with the descriptive anchors of (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To a very great extent." Item 6 employed the eleven-point framework but was anchored by (1, 2, 3) "Poor", (4, 5) "Mixed", (6, 7) "Fair", (8, 9) "Good", and (10, 11) "Outstanding."

The scoring framework for each item consisted of a score from 1 to 11, with higher values indicative of greater approval. Items 3-5 were recoded to be consistent with this interpretation. The vertical suprasystem approval index was formed by averaging the responses to these six items into a single summary score for each case, producing a measure with a theoretical range of 1 to 11. The actual range was 3.800 to 11.000.
A higher score on this index means a higher level of vertical suprasystem approval.

**Horizontal suprasystem approval**

Horizontal suprasystem approval was defined as the extent to which an identified suprasystem, in this case, the local community, finds the output of a component system acceptable. The component system of interest is the county Extension organization. Horizontal suprasystem approval can thus be operationally defined as the extent to which the County Extension Council Chairman approves of county Extension organization operations and performance. Each Council Chairman was asked to answer the following questions related to operations and performance:

1. To what extent are the programs of your County Extension Service consistent with your perception of the needs of people in the county?

2. To what extent does your County Extension Service do a good job in planning programs to meet the needs of people in your county?

3. To what extent does your County Extension Service do a good job in providing programs which meet the needs of people in your county?

4. To what extent does your County Extension Service do a good job in responding quickly to program needs expressed by clientele?

5. To what extent, in comparison to other tax-supported organizations in your county, is your County Extension Service worthy of the public support (tax monies) it receives to carry out its mission?

6. To what extent are you satisfied with the **impact** that the County Extension Service is having on your county in terms of the quantity (number) of educational programs provided to groups in your county?

7. To what extent are you satisfied with the **impact** that the
County Extension Service is having on your county in terms of the quality (how good) of educational programs provided to groups in your county?

(8) To what extent are you satisfied with the impact that the County Extension Service is having on your county in terms of the balanced distribution of educational programs to various groups in your county?

(9) Given your special knowledge of the Extension Service in your county, how would you rate its overall performance?

The response framework associated with items 1-8 consisted of an eleven-point rating scale with the descriptive anchors of (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To a very great extent." Item 9 used the eleven-point framework but was anchored by (1, 2, 3) "Poor", (4, 5) "Mixed", (6, 7) "Fair", (8, 9) "Good", and (10, 11) "Outstanding." The scoring framework for each item consisted of a score from 1 to 11, with higher values indicative of greater approval. The horizontal suprasystem approval measure was formed by averaging the responses to these nine items into a single summary score for each case. The theoretical range of this index is 1 to 11 while the actual range was 3.667 to 11.000. A higher score on this index should be interpreted as a higher level of horizontal suprasystem approval.

Achievement of purpose

Achievement of purpose was defined as the extent to which the quality, quantity, and mix of a system's outputs are consistent with predetermined system objectives. More ordinarily, achievement of purpose was said to refer to goal attainment. In this study, achievement of purpose is operationally defined as the extent to which a County Extension Director perceives that his county Extension organization provides educational programs consistent with specified
goals. County Extension Directors were asked the following questions:

(1) Based on your county goals, to what extent is the quantity (number) of programs provided to clientele groups consistent with your county goals?

(2) Based on your county goals, to what extent is the quality (how good) of programs provided to clientele groups consistent with your county goals?

(3) Based on your county goals, to what extent is the distribution of programs to various clientele groups consistent with your county goals?

(4) Based on your county goals, to what extent is your County Extension Service successful in meeting goals which are relevant to your county's specific needs?

(5) Based on your county goals, to what extent is your County Extension Service successful in meeting the overall goals of the Iowa Cooperative Extension Service (e.g., goals identified at the area level which may or may not be relevant to your county's needs)?

(6) One general goal of Extension is to provide information and education through direct participation in Extension programs and activities. To what extent are individuals and groups in your county receiving these direct benefits from County Extension Service programs?

(7) Given your special knowledge of the Extension Service in your county, how would you rate its overall performance?

Each of these items employed an eleven-point response framework, with higher values indicative of higher achievement of purpose. A variety of descriptive anchors were used. The first item was characterized by (1) "Number falls short of expectations" and (11) "Number meets or exceeds expectations." Item 2 consisted of (1) "Quality falls short of expectations" and (11) "Quality meets or exceeds expectations." Item 3 employed anchors of (1) "Distribution inconsistent with goals" and (11) "Distribution consistent with goals." Items 4-6 were characterized by (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To
a very great extent." The last item was anchored by (1, 2, 3) "Poor", (4, 5) "Mixed", (6, 7) "Fair", (8, 9) "Good", (10, 11) "Outstanding." A single composite score for each case was formed by averaging the responses to all seven items. The resultant index had a theoretical range of 1 to 11 and an actual range of 4.571 to 10.429. A high score on this index means a high level of achievement of purpose.

Efficiency of the output process

Efficiency of the output process was defined as the extent to which maximal output is achieved from a given level of input. It is operationally defined as the extent to which a County Extension Director perceives that (a) county staff time is spent in activities directly related to clientele and (b) that county resources are used as advantageously as possible. County Extension Directors were asked to respond to the following two questions concerning efficiency:

(1) In all organizations, including Extension, some time must be devoted to activities which are not directly related to the organizational mission. These activities can be thought of as "routine maintenance"--like changing the oil in your car. To what extent is staff time in your county devoted to activities where county clientele are not directly involved or receiving benefits; i.e., staff training, filing reports, planning future programs?

(2) As was suggested in (1) above, organizations like Extension must sometimes use their resources inefficiently. Professional staff, for example, may be asked to conduct programs on topics for which they have had little previous training. To what extent is this true in your county?

Both of these items used an eleven-point response and scoring framework, with values recoded such that higher values were indicative of higher efficiency. The first item contained descriptive anchors of (1) "Very little time", (5, 6, 7) "Some time", and (11) "A great deal of time."
The second item was characterized by (1) "To a very little extent", (5, 6, 7) "To some extent", and (11) "To a very great extent." An efficiency index for each case was created by averaging the responses to these two items. The subsequent index had a theoretical range of 1 to 11 and an actual range of 2.000 to 9.500. A high score on this index should be interpreted as high efficiency of the output process.

Before turning to the analysis strategy section, it is useful to review the general and subgeneral hypotheses stated at the empirical level. These hypothesis statements are concisely organized and listed in Figures 3.1 and 3.2.

Analysis Strategy

The purpose of this section is to discuss how the empirical dissertation objectives will be met. In addition, the advantages and disadvantages of viewing the data presented as a sample or population are reviewed. These strategy decisions have direct bearing on the statistical procedures to be followed.

Sample vs. population issues

The empirical unit of analysis in this study has been identified as the county-level Extension Service organization in Iowa. The researcher attempted to secure data from each of these 100 units in Iowa and was successful in obtaining usable information from 90 of them. The immediate issue is whether this data set should be regarded as (a) a complete population (i.e., only 10% of the population is missing) or (b) a nonprobability, convenience sample. The most obvious solution
### System Output Effectiveness Variables

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Figure 3.1. Summary matrix of 16 general empirical hypotheses (i.e., hypothesized relationships between variable measures of organizational constructs and system output effectiveness variables)
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<td>Horizontal External Integration</td>
<td>E.H. 4.6a</td>
<td></td>
<td>E.H. 4.6b</td>
<td>E.H. 4.6c</td>
<td>E.H. 4.6d</td>
</tr>
</tbody>
</table>

Figure 3.2. Summary matrix of 56 subgeneral empirical hypotheses (i.e., hypothesized relationships between organizational variables and system output effectiveness variables)
would be to select the option originally identified by the researcher during the research design process. However, in the area of complex organizations, these decision-making criteria are difficult to implement.

Organizational researchers, like those engaged in other topical areas, would like to be able to generalize their results (i.e., make inferences) beyond their immediate findings. They would like to extend the applicability of their findings to other samples in the same theoretical population. In this study, for example, the researcher would like to make inferences beyond Iowa Extension organizations to such larger groups as Extension units in north central states, all Extension units in the U.S., nonprofit organizations, all organizations, or all purposive systems. The problem of course is that inferences to such populations must be justified by an appropriate sampling strategy. Herein lies the problem for organizational analysts: No one has yet been able to specify or delineate the entire theoretical population of organizations (Blau and Schoenherr, 1971; Hall, Haas and Johnson, 1967; Evers et al., 1976). Accordingly, there is no ready technique for obtaining a probability sample of organizations and thus no way to justify a claim that one has a representative sample of organizations. It seems there are two possible resolutions to this problem that are also appropriate to the research at hand.

The first possible solution is to treat the data as a complete theoretical population and thus offer no generalizations beyond Extension Service organizations in Iowa. Given a usable return rate of 90%, this
solution seems reasonable. This would mean that a failure to obtain empirical support for any of the hypotheses would have to be attributed to specification or measurement error, for the most part, and not sampling error. While this solution is the easiest to defend and is technically the most correct, it places serious limitations on the utility of the data. By recognizing some of the common characteristics that Iowa Extension organizations share with other Extension organizations, it is possible to expand the theoretical population of interest to all county (regional) level Extension organizations in the United States. These commonalities include:

(1) A shared emphasis on four program areas related to agriculture, home economics, youth, and community development.

(2) The employment of full-time Extension workers who are frequently recognized as faculty members of the state land grant university system.

(3) An organizational structure which incorporates the local level organization within a state level organization which in turn is affiliated with a land grant university and the U.S. Department of Agriculture. This rather unique organizational arrangement is visible in nearly every state Extension system.

(4) An organizational philosophy emphasizing grass roots direction and participation in organizational activities. In many states, this includes at least some fiscal responsibility and accountability at the local level as well.

Because of these numerous similarities, the present researcher is confident enough to generalize the results of this study to all local Extension Service organizations in the United States. This theoretical population is justified on the basis of common, shared characteristics rather than on sampling principles. This approach is known as
An issue related to the sample-population distinction concerns the role of statistics in this research. The use of a nonprobability sampling strategy technically precludes making any inferences from these data to the theoretical population of interest (Bakan, 1966; Morrison and Henkel, 1969). However, such inferences can be justified on other grounds. The use of certain statistical procedures, including tests of statistical significance, has been defended by Gold (1969) and Phillips (1971) for the evaluation of hypotheses within theory building research. Such a practice seems reasonable for two reasons. First social scientists frequently must deal with nonrandom samples if they are to investigate those subjects which interest them (Edgington, 1966; Phillips, 1971). To dismiss the logic of hypothesis testing because of a failure to meet sampling standards would place many researchable topics outside the domain of scientific inquiry. Secondly, statistical standards provide at least a partial solution to the problem of incompatible evaluations of hypothesis-related evidence. What constitutes a sufficiently large magnitude in a statistic is often subject to debate. Statistical criteria are in this sense more objective. Finally, the rendering of inferences to a theoretical population of interest can be defended on the basis that tests of statistical significance (e.g., F and t) have been shown to be robust (Boneau, 1961; McNemar, 1969). These arguments are judged to be an adequate justification for the use of selected statistics and for making sample to population inferences in this research. However, the reader is cautioned that the statistics reported here cannot be interpreted in

"non-statistical" inference (Edgington, 1966).
a strict, statistical, theoretical sense and that the statistical signifi-
cance levels should be regarded as approximations of the given test
distributions (see Evers et al., 1976).

In the next section, the strategies for achieving the empirical dis-
sertation objectives introduced in Chapter I are described.

Meeting empirical research objectives

Several empirical objectives of this research were identified in
Chapter I. These objectives are reorganized and restated here in order
to facilitate discussion pertaining to their empirical evaluation. After
each objective is stated, the planned analysis strategy for achieving
the objective is described.

(1) To develop measures of general systems concepts applicable
to open systems, including some holistic properties of
open systems.

The development of measures for concepts involves a variety of
issues related to validity and reliability. Validity is the degree to
which indicators measure what they purport. In this study, validity
topics are considered using a conceptual confirmation approach; that is,
the validity of concepts is inferred from conceptual rather than em-
pirical evidence (Warren et al., 1977). The theoretical rationales
already developed for each concept are designated as the conceptual evi-
dence of validity and are judged to be adequate in this research.

Reliability is used to evaluate the accuracy or precision of a
measure. A measure must manifest reliability if one is to be confident
that it would produce the same results in repeated applications. There
are three basic approaches to reliability: (1) stability (the ability
to achieve the same results using the instrument or measure over repeated trials), (2) equivalence (internal consistency or homogeneity) and (3) accuracy (the relative absence of measurement error or the ratio of observed variation to error variation) (Bohmstedt, 1970; Faisal, 1978).

In this research, the reliability of the multiple item measures will be evaluated using the equivalence and accuracy approaches. In summary, the analysis strategy associated with the achievement of this objective will consist of an evaluation of the internal consistency and accuracy of each multiple item measure.

(2) To empirically develop system output effectiveness (organizational effectiveness) by examining the inter-relationships among the variable measures of their component concepts.

This objective can be achieved through an examination of the zero-order correlations among the variable measures of vertical suprasystem approval, horizontal suprasystem approval, achievement of purpose, and efficiency of the output process. Since the theoretical domain of the system output effectiveness construct has been evaluated as the most adequately represented construct within this research it can be examined in terms of conventional criteria for concept validation. The extent to which the four measures of effectiveness manifest convergent validity will be evaluated.

---

1 It should be noted that two types of measures are used in this research, single-item indicators and index/scales. The latter are composites which are formed by combining multiple items into a single measure. Single item indicators cannot be evaluated for internal consistency or accuracy. As the single item indicators were obtained from carefully maintained records, they are assumed to contain minimal measurement error and are therefore considered reliable.
While there is no single definitive procedure for demonstrating convergent validity when only one method of data gathering has been used, certain guidelines for establishing convergent validity have been identified. These recommendations are frequently presented in discussions related to construct validity (Cronbach and Meehl, 1955; De Groot, 1969; Warren et al., 1977). Convergent validity can be demonstrated by confirmation of theoretically predicted associations with other measures or items. A unidimensional concept, i.e., a concept purported to represent one underlying trait, idea, etc., is generally said to manifest convergent validity if the theoretically based items can be shown to be homogeneous through item-total correlations or interitem correlations. Researchers frequently conclude that a unidimensional concept is valid if the component items are based on theoretical considerations and reveal high (e.g., .7 to .9) interitem correlations. Demonstrating convergent validity in a multidimensional concept-construct like system output effectiveness is more difficult. Multidimensional concepts theoretically presuppose that separate, identifiable subconcepts exist but that these subconcepts, taken together, are indicative of a single overarching idea. Empirically, this means that the items composing each of the subconcepts should manifest those attributes associated with unidimensional concepts while the subconcepts themselves should correlate positively and moderately well with each other (e.g., between .4 and .6). These suggested intercorrelation values should be regarded as approximate however as the consistency requirements for demonstrating convergent validity are not all that well-established (De Groot, 1969:289). Sometimes,
the minimum requirements are only that the dimension intercorrelations be nonnegative. The present researcher feels that in the case of system output (organizational) effectiveness, this standard is too liberal and that the more conventional requirement of intercorrelations in the range of .4 to .6 should be used for empirically demonstrating convergent validity. Low positive or negative intercorrelations will be interpreted as evidence that the dimensions are not part of the same overarching concept. In summary, inspection and evaluation of the intercorrelations among the effectiveness dimensions explicated here will determine whether effectiveness is more validly seen as a multidimensional concept or whether it is more appropriately viewed as a construct. Should the latter designation be deemed the more appropriate, researchers may wish to entertain the notion of working more directly with the explicated dimensions as independent concepts. Finally, as this research is more interested in explanation and theory building, rather than prediction, the correlation values reported will be adjusted for measurement error.

(3) To empirically examine the relationship between each construct category and dimensions of system output effectiveness.

(4) To empirically examine the relationship between each of the concepts representing a construct category and dimensions of system output effectiveness.

These two empirical objectives are treated together as they both pertain to hypothesis testing and interpretation. In the assessment of constructs, multiple correlation coefficients describing the relationship between each construct and each effectiveness dimension will be reported. These coefficients will be calculated using a multiple regression
framework. Only multiple correlations (Rs), however, will be presented. Readers interested in the weighting scheme associated with the independent variables in the calculation of construct Rs will find Table B.2, Appendix B, instructive. Independent variables were weighted by unstandardized regression coefficients (bs), adjusted for measurement error, derived from least squares solutions. These weights yield the greatest accuracy of prediction from the variables available. The concepts--effectiveness analysis will be completed with zero-order Pearsonian correlation coefficients.

A final strategy issue is the determination of what will constitute empirical support for the hypotheses derived. The exploratory nature of this work suggests that the criteria selected not be overly rigid. However, the ability to adjust for measurement error and the lack of justification for sampling error intimates that a lack of support for any given hypothesis is probably a function of specification error. In the absence of clear guidelines, a decision-making matrix is offered (see Figure 3.3), but readers should feel free to use their own judgments in deciding what should be considered as evidence of a substantive relationship. The matrix guidelines for multiple correlation coefficients were devised from probability assessments of the likelihood of adjusted values occurring by chance. The matrix guidelines for zero-order correlation coefficients were devised from probability assessments of the unadjusted values occurring by chance, as Fuller (1977) indicates that t-test results based on adjusted values should be equivalent to those based on unadjusted values. Correlations statistically significant at an F (for multiple correlations) or t (for zero-order correlations) level of .10 were

Table B.3, Appendix B, reports unstandardized regression coefficients unadjusted for measurement error.
<table>
<thead>
<tr>
<th>Number of independent variables in construct</th>
<th>Magnitude of R</th>
<th>Interpretation</th>
<th>Coefficient in Predicted Direction?</th>
<th>No</th>
<th>Absolute magnitude of unadjusted $r$</th>
<th>Interpretation</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0 to .17</td>
<td>Reject hypothesis</td>
<td></td>
<td></td>
<td>0 to .13</td>
<td>Reject hypothesis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.18 to .25</td>
<td>Marginal support</td>
<td></td>
<td></td>
<td>.14 to .17</td>
<td>Marginal support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.26 to .32</td>
<td>Moderate support</td>
<td></td>
<td></td>
<td>.18 to .24</td>
<td>Moderate support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\geq .33$</td>
<td>Strong support</td>
<td></td>
<td></td>
<td>$\geq .25$</td>
<td>Strong support</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0 to .21</td>
<td>Reject hypothesis</td>
<td></td>
<td></td>
<td>0 to .13</td>
<td>Reject hypothesis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.22 to .29</td>
<td>Marginal support</td>
<td></td>
<td></td>
<td>.14 to .17</td>
<td>Marginal support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.30 to .35</td>
<td>Moderate support</td>
<td></td>
<td></td>
<td>.18 to .24</td>
<td>Moderate support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\geq .36$</td>
<td>Strong support</td>
<td></td>
<td></td>
<td>$\geq .25$</td>
<td>Strong support</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0 to .29</td>
<td>Reject hypothesis</td>
<td></td>
<td></td>
<td>0 to .13</td>
<td>Reject hypothesis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.30 to .34</td>
<td>Marginal support</td>
<td></td>
<td></td>
<td>.14 to .17</td>
<td>Marginal support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.35 to .42</td>
<td>Moderate support</td>
<td></td>
<td></td>
<td>.18 to .24</td>
<td>Moderate support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\geq .43$</td>
<td>Strong support</td>
<td></td>
<td></td>
<td>$\geq .25$</td>
<td>Strong support</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.3. Hypothesis-testing decision-making matrix
accorded marginal substantive support. Moderate support was indicated by a value statistically significant at the .05 level and strong support was attributed to relationships manifesting statistical significance at the .01 level. While these guidelines may appear somewhat liberal, particularly in regard to the hypotheses involving constructs, it should be noted that no single construct should be expected to account for all or even a disproportionate amount of the variance in system output effectiveness. In addition, the theory building orientation of this research necessitates a liberal outlook in ascertaining what constructs and concepts should be deleted in future analyses. Only those elements which clearly demonstrate no relationship to effectiveness or a relationship opposite to that posited will be considered as nonsupportive evidence.

The final section of this chapter outlines the statistical procedures followed.

Statistical Procedures

Four statistical procedures are necessary for meeting the empirical objectives of this dissertation and for testing the empirical hypotheses stated in this chapter: reliability, correlation, multiple correlation-regression and measurement error adjustment techniques. Each of these procedures is summarized below.

Reliability

Two approaches to reliability are utilized in this research, the equivalence and accuracy approaches. Under the equivalence perspective, measures of internal consistency are the most popular and accessible.
The internal consistency of a measure describes the degree to which the constituent items are homogeneous. Coefficient alpha will be used to assess the internal consistency reliability of the multiple-item measures (Cronbach, 1967). This reliability procedure assumes that each item in the measure is equally representative of the concept and that each item should receive equal weight within the composite. Other assumptions necessary for estimating reliability are discussed in Nie and Hull (1977). A reliability coefficient of .60 seems to indicate a meaningful reliability estimate in sociological research in view of Bohrnstedt and Carter's (1971) observation that few sociological measures demonstrate reliability estimates greater than .80. In addition, Nunnally (1967) has argued that a coefficient of .50 is adequate for exploratory research. Coefficient alpha reliability estimates are calculated using an updated version of the Statistical Package for the Social Sciences (SPSS) computer program (Nie et al., 1975; Nie and Hull, 1977).

Reliability is often defined as the relative absence of measurement error in a measuring instrument (Kerlinger, 1973:443). This definition underscores the accuracy aspect of reliability. According to measurement theory, the total observed variance in a measure can be decomposed into a true score variance component and a measurement error variance component (Guilford and Fruchter, 1973:396-400). A highly accurate and reliable measure would be one with a high proportion of true score variance and a low proportion of measurement error variance. An F test can be used to evaluate the extent to which a measure is characterized by measurement error variance (Faisal, 1978).

The null hypothesis associated with this F test procedure states
that the variance of the true values of a measure is zero (i.e., \( H_0 \):
\[ S_{x_1}^2 = 0 \], where \( S_{x_i}^2 \) is the true score variance of variable \( x_i \)). The alternate hypothesis is that the variance of the true values of the measure is not equal to zero (i.e., \( H_a: S_{x_1}^2 \neq 0 \)). The test is then calculated by the following formula:

\[
F = \frac{\text{total observed variance}}{\text{measurement error variance}} = \frac{S_X^2}{s_e^2}
\]

Both numerator and denominator degrees of freedom associated with this test are equal to the number of sample cases minus one. The calculation formula for estimating the measurement error variance component, which is based on the internal consistency and the observed variance of the measure, is available in Faisal (1978:301-302). Based on a designated level of significance, a statistically significant \( F \) value means that one can reject the null hypothesis and report that a piece of evidence exists to support the alternate hypothesis. Substantively, this means that at least some of the observed variance in the focal measure can be attributed to true score values and that the measure is composed of more than measurement error variance. Hence, a significant \( F \) value indicates an accurate or reliable measure. A nonsignificant \( F \) value would infer that most of the observed variance in the measure was due to measurement error, and would in turn indicate an unreliable index.

**Correlation**

Correlation coefficients indicate the degree of association or covariation between two variables. The Pearson product-moment coefficient, symbolized by the letter \( r \), is used in this dissertation. This statistic
indicates the degree of association between two variables. The r value can range from -1.00 (denoting an inverse linear relationship) to +1.00 (denoting a positive linear relationship). Thus, r indicates both the strength and direction of a linear relationship. Correlation coefficients do not distinguish between cause and effect.

Some general observations on the nature and importance of meeting statistical assumptions are now appropriate. These remarks pertain not only to correlation but to the next procedure, multiple correlation-regression. A basic point to be recognized is that there are no assumptions, beyond those implicit in algebraic operations, necessary in order to calculate a zero-order or multiple-correlation coefficient (Binder, 1959; Hays, 1963; Kerlinger, 1973). If the researcher is solely interested in describing relationships within the data set at hand (i.e., among Iowa Extension Service organizations), there is no necessary need to meet the statistical assumptions commonly associated with use of these two procedures. These assumptions are required only when the researcher wishes to make inferential interpretations and generalizations (e.g., statistical estimation of population parameters, setting confidence intervals, testing statistical hypotheses). As this research is concerned with (a) hypothesis testing and (b) generalizations to a broader theoretical population, some attention to meeting underlying statistical assumptions would seem appropriate.

The assumptions underlying the use of the Pearsonian r in making sample to population inferences include: (1) a simple random sample of the population, (2) independent observations, (3) interval level of
measurement of variables, (4) normal distribution of variables, and
(5) a linear relationship between variables (Loether and McTavish, 1976).
The nonprobability sampling technique used in this study requires that
the first two assumptions be accepted without critical evaluation. Most
of the variable measures were conceptualized as interval level proper­
ties, as indicated by the inclusion of ordered-metric response and scor­
ing frameworks. Blalock (1974) suggests that when our concepts reflect
interval level formulations (i.e., include ideas related to relative dis­
tances), we should attempt to take advantage of interval level measure­
ment models--even when we anticipate that data-collection procedures
will yield ordinal scales at best. Furthermore, there is at least some
evidence to indicate that ordinal level data can be treated as interval
level without serious distortion (Burke, 1953; Boneau, 1961; Baker et al.,
1966; McNemar, 1969, Labovitz, 1967). More confidence can be placed
in the robustness of F and t tests, however, than in measures of asso­
ciation when serious level of measurement violations occur (Boneau,
1961). On the whole, the assumption of interval level measurement is
judged to have been adequately met.

The assumption of a normal distribution of variables (normality)
pertains to the extent to which a distribution of sample cases approxi­
mates a normal curve. Correlation values are said to be attenuated by
serious violations in normality, with most discussions stressing the
importance of at least a symmetric, unimodal distribution in the absence
of a perfect bell-shaped curve (Blalock, 1960; McNemar, 1969). More
specifically, outlying cases or a general skewness in either variable
is said to impose a maximal ceiling on the magnitude of $r$ less than its theoretical maximums of $\pm 1.00$. There are three generally recognized tests of normality: the chi square goodness of fit test, the skewness test, and tests of kurtosis (Snedecor and Cochran, 1976). The chi square test is a nonspecific test in that it does not test for a specific departure from normality. Snedecor and Cochran report that this test is sometimes insensitive to skewness and thus it was eliminated from consideration. Tests of kurtosis are available but there are no tables for evaluating their statistical significance in sample sizes of less than 200. Accordingly, the normality assumption was assessed through a statistical test of skewness. The skewness statistic, sometimes called the third moment, estimates the degree to which a distribution deviates from symmetry. When the observed distribution is a symmetric bell-shaped curve, the skewness statistic will be zero. The calculation formula for skewness used in this study is available in Nie et al. (1975). Skewness values are reported in Table B.1, Appendix B. The majority of skewness values were statistically significant, indicating a marked departure in normality. At least two interpretations of this finding are possible. One is that the data are somehow atypical from that one would expect in repeated sampling and that the correlational results will likely be attenuated and nongeneralizable. Alternatively, one might consider, the Law of Large Numbers aside, whether the concepts measured are simply not normally distributed in the "real world" (Carter, 1971). The latter interpretation seems more plausible. For example, it is not surprising to observe that the effectiveness measures are all negatively skewed,
indicating a clustering of scores toward the high effectiveness end of the scales. This sort of response style is expected in such a sensitive topic area. It was decided not to transform the data to approximate a more normal distribution because (1) Snedecor and Cochran (1976:88) argue that Pearsonian correlation is robust under all but extreme normality violations, (2) the potential bias is one of attentuation and not inflation, and (3) tests of statistical significance have also been shown to be robust in cases of nonnormality (Young and Veldman, 1965).

The assumption of a linear relationship between two variables means that if one were to plot the data corresponding to measurements on the two variables, that plot would resemble a straight line. Thus one way to assess the assumption of linearity is to visually inspect a scatter diagram relating the two variables. Alternately, one can assess linearity by performing a linear trend test (Nie et al., 1975:258-261). Such a test allows the user to detect whether the relationship between a dependent variable and an independent variable is solely linear by estimating the proportion of variance in the dependent variable that is linearly explained and that which is nonlinearly explained. An F test is used to determine whether a statistically significant amount of the explained variance is attributable to the nonlinear component. This procedure was used to evaluate the linearity assumption in 16 randomly selected zero-order relationships. None of these relationships was found to manifest any evidence of nonlinearity. It is assumed that the remaining zero-order relationships examined in the present work are representative of these findings and that the postulate of linearity can
Multiple correlation-regression

Multiple correlation is an analysis technique which expresses the degree of linear association (correlation) between actual scores on a dependent variable and the scores of the dependent variable predicted by the use of a multiple regression equation (Loether and McTavish, 1976; Kerlinger, 1973). Multiple correlation can also be thought of as the simple correlation between a dependent variable and a set of more than one independent variables. It represents the highest possible correlation between a least squares linear composite of independent variables and the observed dependent variable. The multiple correlation coefficient squared, $R^2$, indicates how much of the total variance in the dependent variable can be accounted for by the independent variables (Kerlinger and Pedhazur, 1973). The $R$ value has a theoretical range of 0 to 1.00, with larger values indicating stronger relationships. The extent to which an observed $R$ value is not a function of chance can be estimated by calculation of an $F$ ratio. A statistically significant $F$ ratio is one sufficiently large that one is confident that the underlying $R$ value did not arise by chance (Kerlinger, 1973).

Multiple correlation coefficients can be calculated in a number of ways. Most frequently, these coefficients are incorporated into an analysis of variance or multiple regression framework. The multiple regression framework was deemed the most appropriate for this research in order to take advantage of the interval level of measurement and the (relatively) continuous nature of the independent variables (Kerlinger and Pedhazur,
1973). Moreover, multiple regression is more versatile than most analysis of variance designs (i.e., it is more readily adaptable to polynomial regression, path analysis, etc.). However, as the focus of this study is only on estimating the relationship between a dependent variable and a given set of independent variables, only those multiple regression assumptions necessary for the calculation and interpretation of R are necessary.

Loether and McTavish (1976) have conveniently identified these assumptions: (1) a simple random sample of the population, (2) independent observations, (3) a large sample size, (4) all variables measured at an interval level, (5) all variables normally distributed, and (6) all variables linearly related. Again, the nonprobability sampling technique precludes evaluation of the first two assumptions and requires that they be adopted without question. However, the reputed robustness of F and t tests makes this assumption less problematic (Blalock, 1960; Boneau, 1961) and reasonable in the context of discovery (Phillips, 1971). A large sample size is advocated because R becomes unstable and tends to be over-estimated in small samples (Faisal, 1978). In order to compensate for the data-bound nature of the R value, researchers often adjust the R value for small sample size and the number of independent variables in the model (i.e., correct for shrinkage). Kerlinger and Pedhazur (1973:442) recommend samples of at least 100 cases to avoid such over-estimation. As the sample size in this study is 90, this assumption is judged to an important one. Accordingly, corrections for shrinkage will be implemented before reporting R values. The assumptions concerning
the level of measurement and normality were discussed at length in the previous section on correlation. Those arguments are equally relevant in the case of multiple correlation and justify the acceptance of the two assumptions here. In addition, violations of normality (and homoscedasticity) within multiple regression frameworks have received specific examination and are reported to not cause serious distortions (Bohrnstedt and Carter, 1971; Zeller and Levine, 1974). The final assumption on linearity is difficult to evaluate in the multivariate situation. This is because errors related to the form of a relationship (i.e., linear versus curvilinear) are bound to specification error which included various kinds of errors, such as an insufficient number of correct variables in the regression model. For these reasons, the assumption of linearity is simply adopted. However, readers interested in making such assessments will find the techniques described by Draper and Smith (1966) for calculating and plotting residuals useful in estimating the linear fit between a dependent variable and a set of independent variables. In the final section of this chapter, the last statistical procedure is discussed: Measurement error adjustment techniques.

**Measurement error adjustment techniques**

Measurement error has been identified as one of the most serious problems in sociological research (Warren et al., 1977). The vast majority of sociologists tend to assume that their variables are measured without error or disregard the issue entirely (Bohrnstedt and Carter, 1971; Stokes and Miller, 1975). Since few sociological measures manifest reliability estimates of more than .8, the lack of concern for the
effects of measurement error is surprising. Bohnstedt and Carter (1971) report that one can expect parameter estimates of zero-order relationships to be attenuated by 20% or more and that partial regression coefficients can be either under or over estimated in the presence of measurement error. In contrast to this assessment, however, Bielby et al. (1977) suggest that the current level of knowledge and data about the effects of measurement error are insufficient to warrant conclusions of either negligible or substantial bias. Hence it would seem that (a) there is consensus concerning the pervasiveness of measurement error in sociological research, (b) that these errors can and should be taken into account but that (c) the effects of not adjusting for measurement error are unclear. Adjustments for measurement error are regarded as appropriate for this research for two reasons. First, this research is concerned with theory building rather than prediction and thus is interested in estimating and evaluating "true" relationships (i.e., relationships devoid of measurement and sampling error). Secondly, whether the effects of measurement error are ultimately judged to be negligible or substantial, researchers ought to be concerned with improving their measurement techniques in order to obtain the best estimates of relationships possible. In short, this researcher is sympathetic to the need for greater consideration of measurement error in sociological research and thus will implement adjustment techniques prior to the evaluation of the substantive research hypotheses. Readers interested in unadjusted values, however, are invited to consult the tables in Appendix B.

Until recently, techniques for adjusting for measurement error
in other than bivariate relationships have been generally unavailable under the assumption of random measurement error. The well-known correction for attenuation has, however, been extremely useful for estimating the true relationship between two variables devoid of measurement error (Guilford and Fruchter, 1973). It is calculated by the following formula:

\[
\frac{r_{xy}}{\sqrt{r_{xx}} \sqrt{r_{yy}}} = r_{tt}
\]

Where \( r_{tt} \) = the correlation between true scores of variable x and variable y; \( r_{xy} \) = the correlation between observed scores of variable x and variable y; and \( r_{xx} \) and \( r_{yy} \) are the reliability estimates for variables x and variable y, respectively. This technique is used to correct for measurement error in assessing the true relationships between the system concepts identified in the bivariate hypotheses and system output effectiveness. In situations involving a multiple number of independent variables and a dependent variable, the Joreskog factor analytic approach and the errors-in-variables regression technique are recognized as appropriate measurement error adjustment procedures. The Joreskog technique is not readily available and thus was not considered for this research. Accordingly, the errors-in-variables (EIV) approach was selected for assessing the true relationship between the system constructs and system output effectiveness. Its use is also facilitated by the recent completion of a computer program, Super Carp (Cluster Analysis and Regression Program), which has reduced the amount of calculation work and expertise necessary to use the procedure (Hidiroglou et al.,
The errors-in-variables procedure takes measurement error and specification error into consideration in assessing the relationship between a dependent variable and one or more independent variables (Faisal and Warren, 1978). Two types of specification error are the inclusion of the wrong form of variable relationships within the model (e.g., cubic, linear, quadratic) and the failure to include a sufficient number of important variables in the model. The EIV procedure allows for testing for specification error and provides estimates of relationships adjusted for measured errors. In this particular application of the EIV procedure, the assumption of random measurement errors was made. The adjusted R values can be interpreted as the amount of variation in the true values of the dependent variable explained by the true values of the independent variables. It should be noted that in the bivariate correction for attenuation procedure the adjusted correlation is always higher than the uncorrected value but that in the EIV situation, the adjustment may produce a higher or lower R value. Discussion of other technical aspects, assumptions, uses etc. of the EIV procedure are available in Faisal and Warren (1978) and Aziz (1978). Readers interested in further exploration of this topic should consult these sources as well as the following sociological studies which have attempted to adjust for measurement error in multivariate situations: Warren et al. (1974), Bielby et al. (1977) Turner and Martinez (1977), and Kluegel et al. (1977).
CHAPTER IV. FINDINGS AND DISCUSSION

The purpose of this chapter is to discuss the research findings associated with the empirical objectives delineated in Chapter III and to test the general and subgeneral hypotheses stated in Chapter II. This chapter is divided into four sections, each corresponding to an empirical objective. Reliability of the variable measures is assessed using internal consistency and accuracy approaches. The empirical measures representing the system output effectiveness construct are examined for evidence of convergent validity. Finally, the sixteen general and fifty-six subgeneral hypotheses are reviewed and evaluated using the decision-making matrix presented in the previous chapter. Recommendations concerning what constructs and concepts should be retained for future analyses are also made.

Reliability Analysis

One objective of this research has been identified as the development of measures of general systems concepts applicable to open systems. The extent to which this objective has been achieved can be evaluated through internal consistency and accuracy assessments of the reliability of these measures (see Table 4.1). Only multiple item measures are discussed as the single item measures obtained from records cannot be evaluated for reliability. They are assumed to be measured without error and therefore highly reliable.

The internal consistency of each multiple item measure was
Table 4.1. Reliability of system measures based on internal consistency and accuracy approaches

<table>
<thead>
<tr>
<th>System measure</th>
<th>Coefficient of reliability</th>
<th>Measurement error F test&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived environmental uncertainty</td>
<td>.60</td>
<td>2.48</td>
</tr>
<tr>
<td>Environmental instability</td>
<td>.86</td>
<td>7.14</td>
</tr>
<tr>
<td><strong>Inputs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of skills&lt;sup&gt;b&lt;/sup&gt;</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Level of experience&lt;sup&gt;b&lt;/sup&gt;</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Perceived resource support</td>
<td>.82</td>
<td>5.47</td>
</tr>
<tr>
<td><strong>Throughputs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socialization</td>
<td>.63</td>
<td>2.67</td>
</tr>
<tr>
<td>Communication</td>
<td>.81</td>
<td>5.30</td>
</tr>
<tr>
<td>Commitment</td>
<td>.82</td>
<td>5.44</td>
</tr>
<tr>
<td><strong>System properties</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical suprasystem feedback</td>
<td>.86</td>
<td>7.01</td>
</tr>
<tr>
<td>Horizontal suprasystem feedback</td>
<td>.82</td>
<td>5.48</td>
</tr>
<tr>
<td>Negentropy&lt;sup&gt;b&lt;/sup&gt;</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Internal integration</td>
<td>.87</td>
<td>7.64</td>
</tr>
<tr>
<td>Vertical external integration</td>
<td>.86</td>
<td>7.20</td>
</tr>
<tr>
<td>Horizontal external integration</td>
<td>.90</td>
<td>10.26</td>
</tr>
<tr>
<td><strong>System output effectiveness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical approval of output</td>
<td>.84</td>
<td>6.07</td>
</tr>
<tr>
<td>Horizontal approval of output</td>
<td>.91</td>
<td>11.17</td>
</tr>
<tr>
<td>Achievement of purpose</td>
<td>.86</td>
<td>7.37</td>
</tr>
<tr>
<td>Efficiency of the output process</td>
<td>.47</td>
<td>1.88</td>
</tr>
</tbody>
</table>

<sup>a</sup>All values are significant at the .05 level.

<sup>b</sup>Single item measures.
calculated using Cronbach's alpha (Cronbach, 1967). Only one of the measures, efficiency of the output process, failed to meet the minimal criterion for acceptable reliability (i.e., .60). The .47 alpha coefficient associated with the efficiency measure means that the items composing efficiency are not internally consistent and therefore are not highly reliable. However, as little research has been devoted to efficiency within a general systems framework, the measure is considered to be the best available and retained in this investigation. In addition, the lack of internal consistency can be adjusted for before estimating relationships involving efficiency. The remaining fourteen multiple item measures manifested adequate internal consistency. Two measures demonstrated alpha values of .60 and .63 while the final twelve, including all of the variable measures of the holistic system properties, reported alpha values of at least .81. In summary, the internal consistency findings indicate that the measures developed in this research are sufficiently reliable for hypothesis evaluation purposes and for subsequent research endeavors in similar organizational units.

The findings generated under the accuracy approach yield similar support for the reliability of the measures. Accuracy, or the ratio of observed variance to error variance within a measure, was assessed by calculation of an F test for measurement error. The F ratios presented in Table 4.1 are all statistically significant at the .05 level indicating that at least some of the observed variation in each measure is due to true variation and not random variation. The higher the F ratio value, the more variation that can be attributed to true values and the
more confidence one has in the accuracy of the measure. High accuracy, in turn, is another indicator of high reliability. These F ratio findings thus suggest that the measures developed here are reliable from the accuracy perspective.

In summarizing this section describing the findings related to reliability, all of the multiple item measures were found to exhibit evidence of adequate reliability. In addition, the theoretical explanations which were developed in linking conceptual definitions, operational definitions and operational measures for each concept constitute evidence of each concept's validity. The acquisition of reliable and valid measures of these general systems concepts suggests that the objective of developing such measures has been achieved. In the following sections the relationship among these measures are discussed.

Empirical Assessment of the Effectiveness Construct

An underlying issue in this research is whether system output effectiveness (or its less abstract counterpart, organizational effectiveness) is more validly viewed as (a) a multidimensional concept or (b) a construct. This issue led to the identification of a research objective calling for an empirical examination of the interrelationships among the variable measures of the concepts comprising system output effectiveness (i.e., vertical suprasystem approval, horizontal suprasystem approval, achievement of purpose, and efficiency of the output process). As was indicated in the discussion of the analysis strategy for meeting this research objective, it was determined that if system output effectiveness
is a single (albeit multidimensional) concept, the component dimensions should manifest evidence of convergent validity (i.e., moderate, positive intercorrelations in the range of .4 to .6). The data presented in Table 4.2 indicate that this pattern of intercorrelation is not associated with assessment of system output effectiveness dimensions. The intercorrelations range from -.05 to .30 and suggest that these dimensions of effectiveness do not covary together to any great extent. These relatively low correlation values are interpreted to mean that system output effectiveness (organizational effectiveness) is not a multidimensional concept, according to generally recognized empirical standards for demonstrating multidimensionality. Substantively, this means that one should not expect systems or organizations which are effective in one performance area to be necessarily effective in other areas. The implications of this finding for the future study of effectiveness are discussed in the following concluding chapter. However, it would seem prudent to recognize each of the four dimensions of effectiveness explicated in this research as separate, independent concepts.

Evaluation of Hypotheses Relating System Constructs and System Output Effectiveness

The purpose of this section is to report and discuss the findings related to the sixteen general hypotheses formulated in Chapter II. More specifically, the multiple correlation coefficients between the variable measures of the four system constructs (environmental, inputs, throughputs, system properties) and measures of system output effectiveness are presented. The relevant data describing these findings are
Table 4.2. Intercorrelations among system output effectiveness measures

<table>
<thead>
<tr>
<th>System output effectiveness</th>
<th>Vertical suprasystem approval</th>
<th>Horizontal suprasystem approval</th>
<th>Achievement of purpose</th>
<th>Efficiency of output process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical suprasystem approval</td>
<td>--</td>
<td>.16*</td>
<td>.30***</td>
<td>.24*</td>
</tr>
<tr>
<td>Horizontal suprasystem approval</td>
<td>--</td>
<td>.18*</td>
<td></td>
<td>-.05</td>
</tr>
<tr>
<td>Achievement of purpose</td>
<td></td>
<td></td>
<td>.14</td>
<td></td>
</tr>
<tr>
<td>Efficiency of output process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a Adjusted for measurement errors using correction for attenuation.

* Significant at the 0.10 level.

*** Significant at the 0.01 level.
In order to avoid an unnecessarily tedious and unwieldy presentation of the findings, a standard reporting format is adopted. Each general hypothesis is restated at the abstract level and incorporates the four aspects of effectiveness recognized in this research (i.e., vertical suprasystem approval, horizontal suprasystem approval, achievement of purpose, and efficiency of the output process). Differences in the findings associated with each aspect of effectiveness will be highlighted in the text discussion. In summary, this format will facilitate the evaluation of all sixteen hypotheses by organizing them into four readily comprehensible subsections.

Organizational environment

The first general hypothesis stated:

G.H.1: The environment of a system is related to system output effectiveness.

There was evidence of some support for this hypothesis for each of the four aspects of system output effectiveness. The relationship between achievement of purpose and the environment of a system was strongly supported (R=.39), while the other three effectiveness dimensions manifested marginally supported relationships (Rs = .22, .18, and .19) (see Table 4.3).

All research hypotheses are evaluated after adjustments have been made for measurement error. Tables B.4 through B.8, in Appendix B, report unadjusted correlational values used in this research. It is not an objective of this dissertation to discuss the data in Appendix B.
Table 4.3. Multiple correlation coefficients and zero-order correlations between the environmental construct measure, environmental concepts' measures, and measures of system output effectiveness

<table>
<thead>
<tr>
<th>Environmental measures</th>
<th>System output effectiveness measures</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vertical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>suprasystem</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>approval</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>r</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational environment</td>
<td>.22*</td>
<td>.18*</td>
<td>.39***</td>
<td>.19*</td>
<td></td>
</tr>
<tr>
<td>Perceived environmental uncertainty</td>
<td>-.26**</td>
<td>-.23*</td>
<td>-.41***</td>
<td>-.20*</td>
<td></td>
</tr>
<tr>
<td>Environmental instability</td>
<td>.07</td>
<td>.03</td>
<td>.01</td>
<td>-.10</td>
<td></td>
</tr>
</tbody>
</table>

Adjusted for measurement errors using errors-in-variables for multiple correlation values and by correction for attenuation for zero-order values.

* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.
These findings are consistent with previous theory and research describing the environment-organizational system interface. The greater support for the achievement of purpose aspect of effectiveness is not surprising given that the relevant theoretical and empirical treatments of the general hypothesis have stressed outcome or goal measures rather than approval or efficiency (Neuhauser and Andersen, 1974; Hirsch, 1975b; Khandwalla, 1974). The lack of strong support for these latter aspects of effectiveness may also provide implicit support for the contingency approach. Perhaps the observed correlations between the environmental construct and effectiveness are higher in systems where particular structural arrangements and internal processes "match" environmental conditions. Though contingency propositions were not evaluated here, they can be identified as a logical starting point for future research endeavors.

In summary, these findings which describe the relationship between a system's or organization's environment and its effectiveness are consistent on one point. The environmental construct has at least some impact on system output (organizational) effectiveness, regardless of whether effectiveness is defined as approval, achievement of purpose, or efficiency. Hence, the environmental construct seems to be worthy of retention in subsequent analyses of organizational systems. The next subsection focuses on the inputs construct.
Inputs

The general hypothesis involving the inputs construct stated that:

G.H.2: Inputs of a system are related to system output effectiveness.

In comparison with the other constructs (i.e., the environment, throughputs, and system properties), inputs received the least support as a determinant (covariate) of system output effectiveness. The general hypothesis relating inputs and effectiveness was accorded marginal support for the achievement of purpose ($R = .23$) and efficiency ($R = .25$) dimensions and no support for the two approval dimensions. This suggests that inputs are not associated with approval of suprasystems and that they are only tangential to achievement of purpose and efficiency (see Table 4.4).

In view of the reputed criticality of inputs and their continued emphasis in the literature, the lack of universal endorsement of the hypothesis is surprising (Kuhn, 1974; Katz and Kahn, 1966; Mulford and Klnglan, 1972; Hannan and Freeman, 1977; among others). However, others (e.g., Georgopoulos, 1974; Scott, 1977) have at least predicted that confirmation of the hypothesized relationship would be difficult to demonstrate. A possible, partial explanation of these findings might be that the achievement and efficiency dimensions represent evaluations of effectiveness from the internal perspective and that inputs are seen as more crucial by internal evaluators. Inputs, from the perspective of those within the system, define the parameters of what one "has to work with" and are thus seen as more influential in determining organizational system outcomes. In other words, internal evaluators may unintentionally incorporate the quality of their inputs into their effectiveness
Table 4.4. Multiple correlation coefficients and zero-order correlations between the inputs construct measure, inputs concepts' measures, and measures of system output effectiveness

<table>
<thead>
<tr>
<th>Inputs measure</th>
<th>System output effectiveness measures</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vertical suprasystem approval</td>
<td>Horizontal suprasystem approval</td>
<td>Achievement of purpose</td>
<td>Efficiency of output process</td>
</tr>
<tr>
<td></td>
<td>R               r</td>
<td>R               r</td>
<td>R               r</td>
<td>R               r</td>
</tr>
<tr>
<td>Inputs</td>
<td>.17</td>
<td>--b</td>
<td>.23*</td>
<td>.25*</td>
</tr>
<tr>
<td>Level of skills</td>
<td>.23**</td>
<td>-.15(^c)</td>
<td>.11</td>
<td>.11</td>
</tr>
<tr>
<td>Level of experience</td>
<td>.04</td>
<td>-.03</td>
<td>-.12</td>
<td>.15*</td>
</tr>
<tr>
<td>Perceived resource support</td>
<td>-.01</td>
<td>-.03</td>
<td>.24**</td>
<td>.27**</td>
</tr>
</tbody>
</table>

\(^a\)Adjusted for measurement errors using errors-in-variables for multiple correlation values and by correction for attenuation for zero-order values.

\(^b\)Adjusted value cannot account for any variation in system output effectiveness measure.

\(^c\)Statistically significant at the 0.10 level but in opposite direction hypothesized.

\(^*\)Significant at the 0.10 level.

\(^{**}\)Significant at the 0.05 level.
assessments, regardless of their actual performance levels. External evaluators, on the other hand, are not as sensitive to this link and do not implicitly consider it when rendering effectiveness evaluations. This partial explanation is recognized as highly conjectural and offered only as a possible alternative explanation.

On the basis of these findings, however, it must be concluded that the inputs construct is unrelated to vertical and horizontal suprasystem approval and only marginally related to achievement of purpose and efficiency. Subsequent investigations should probably retain the inputs construct, not because of its ability to explain effectiveness, but to serve as additional evidence that the conventional wisdom surrounding the importance of inputs as a determinant of effectiveness is questionable. The contingency approach, too, merits further consideration. Inputs may become more important in the presence of other conditions.

Throughputs is the next construct to be reviewed.

**Throughputs**

The throughputs construct was hypothesized to be related to system output effectiveness.

**G.H.3:** Throughputs of a system are related to system output effectiveness.

The hypothesis involving this construct indeed received "mixed" support. Each of the identified aspects of system output effectiveness manifested a different relationship with the throughputs construct. Vertical suprasystem approval was totally unrelated to throughputs (R=.09). Horizontal suprasystem approval, on the other hand, demonstrated the highest
relationship with throughputs ($R = .36$). Achievement of purpose and efficiency were accorded intermediary levels of support (i.e., $R = .32$—moderate and $R = .25$—marginal, respectively) (see Table 4.5).

These divergent findings are not totally unanticipated. First, these differential relationships underscore the contention that system output effectiveness is composed of independent concepts not necessarily related to each other in a consistent manner. The previous findings related to the environment and inputs constructs, as well as the forthcoming review of system properties findings, also indicated the uniqueness of each effectiveness dimension. But the point is especially well-dramatized here as a different substantive interpretation is associated with each effectiveness dimension. In addition, the throughputs construct has received very little empirical attention in the past, as a construct, suggesting that the utility of the construct is still open to debate and that some unexpected findings might emerge.

These findings indicate that the assessment of the throughputs construct is particularly dependent on the aspect of effectiveness under investigation. No overall recommendation concerning its general utility in explaining system output effectiveness can be made at this time. Hence, researchers are advised to retain the construct, except when the dimension of interest is limited to vertical suprasystem approval. In this situation, the throughputs construct can be deleted. The final construct examined is the system properties construct.
Table 4.5. Multiple correlation coefficients and zero-order correlations between the throughputs construct measure, throughputs concepts' measures, and measures of system output effectiveness

<table>
<thead>
<tr>
<th>Throughputs measures</th>
<th>System output effectiveness measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vertical suprasystem approval</td>
</tr>
<tr>
<td>Throughputs</td>
<td>R</td>
</tr>
<tr>
<td>Throughputs</td>
<td>.09</td>
</tr>
<tr>
<td>Socialization</td>
<td>-.05</td>
</tr>
<tr>
<td>Communication</td>
<td>-.14</td>
</tr>
<tr>
<td>Commitment</td>
<td>.11</td>
</tr>
</tbody>
</table>

* Adjusted for measurement errors using errors-in-variables for multiple correlation values and by correction for attenuation for zero-order values.

* Significant at the 0.10 level.

** Significant at the 0.05 level.

*** Significant at the 0.01 level.
System properties

The general hypothesis involving the system properties construct stated that:

G:H.4: System properties are related to system output effectiveness.

This hypothesis has the distinction of being strongly supported in two instances and totally unsupported in the remaining two. The multiple correlation coefficient between the system properties construct and achievement of purpose was .66 while the coefficient describing the relationship between system properties and efficiency was .54. Both of these values were substantively interpreted as evidence of a strong relationship. The relationships between system properties and the two forms of approval effectiveness were statistically nonsignificant ($Rs < .20$) (see Table 4.6).

As indicated in Chapter II, the inclusion of a system properties construct within the basic input-throughput-output model is regarded as the most exploratory aspect of this research. These findings, accordingly, should be viewed as preliminary and in particular need of replication. The findings are, however, consistent with theoretical contentions related to system properties in the cases involving achievement of purpose and efficiency. Georgopoulos (1973) has inferred that system properties can influence a system's problem-solving ability while Berrien (1968) has argued that the state of a system is a determinant of its output. The lack of empirical support for the purported relationship between the system properties construct and the approval dimensions, combined with the absence of explicit theoretical discussion of the proposed
Table 4.6. Multiple correlation coefficients and zero-order correlations between the system properties construct measure, system properties concepts' measures, and measures of system output effectiveness

<table>
<thead>
<tr>
<th>System properties measures</th>
<th>Vertical suprasystem approval</th>
<th>Horizontal suprasystem approval</th>
<th>Achievement of purpose</th>
<th>Efficiency of output process</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>r</td>
<td>R</td>
<td>r</td>
</tr>
<tr>
<td>System properties measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical suprasystem feedback</td>
<td>-.02</td>
<td>-.07</td>
<td>-.07</td>
<td>-.03</td>
</tr>
<tr>
<td>Horizontal suprasystem feedback</td>
<td>.20*</td>
<td>.20**</td>
<td>.20**</td>
<td>.25**</td>
</tr>
<tr>
<td>Negentropy</td>
<td>-.06</td>
<td>-.03</td>
<td>-.06</td>
<td>-.03</td>
</tr>
<tr>
<td>Internal integration</td>
<td>.01</td>
<td>.03</td>
<td>.01</td>
<td>.03</td>
</tr>
<tr>
<td>Vertical external integration</td>
<td>.02</td>
<td>.02</td>
<td>.02</td>
<td>.02</td>
</tr>
<tr>
<td>Horizontal external integration</td>
<td>.02</td>
<td>.02</td>
<td>.02</td>
<td>.02</td>
</tr>
</tbody>
</table>

* Adjusted for measurement errors using errors-in-variables for multiple correlation values and by correction for attenuation for zero-order values.

b Adjusted value cannot account for any variation in system output effectiveness measure.

c Statistically significant at the 0.01 level but in opposite direction hypothesized.

* Significant at the 0.10 level.

** Significant at the 0.05 level.

*** Significant at the 0.01 level.
linkages, suggests that no clear relationships exist. The recommendation emanating from these findings is that the system properties construct be retained when effectiveness is conceptualized as achievement of purpose or efficiency but that it may be deleted in studies emphasizing vertical or horizontal approval of output.

**Summary of the relationships between system constructs and system output effectiveness**

The summary matrix provided in Table 4.7 describes the substantive evaluation of the sixteen general hypotheses reviewed in this section. Of these sixteen hypotheses, four were strongly supported, one was moderately supported, six received marginal support, and five were not supported. From the system construct perspective, the organizational environment appeared the most useful in generally explaining system output effectiveness. It was accorded some support in each effectiveness area. The inputs construct is evaluated as the least useful construct. Inputs manifested only marginal support for two dimensions of effectiveness and was unsupported in the other two effectiveness areas. The throughputs and system properties constructs demonstrated uneven utility, with each construct being supported in some effectiveness areas but not in others. However, as system properties represented an innovative, previously unevaluated construct, its ability to explain system output effectiveness as well or better than inputs and throughputs merits note. This construct should definitely be considered in subsequent investigations as it has demonstrated potential utility equivalent to that of other system constructs.
Table 4.7. Summary matrix describing substantive evaluation of the 16 general hypotheses

<table>
<thead>
<tr>
<th>Organizational constructs</th>
<th>Vertical suprasystem approval</th>
<th>Horizontal suprasystem approval</th>
<th>Achievement of purpose</th>
<th>Efficiency of output process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational environment</td>
<td>Marg. supp. (^a)</td>
<td>Marg. supp.</td>
<td>S. supp. (^b)</td>
<td>Marg. supp.</td>
</tr>
<tr>
<td>Inputs</td>
<td>NS (^c)</td>
<td>NS</td>
<td>Marg. supp.</td>
<td>Marg. supp.</td>
</tr>
<tr>
<td>Throughputs</td>
<td>NS</td>
<td>S. supp.</td>
<td>Mod. supp. (^d)</td>
<td>Marg. supp.</td>
</tr>
<tr>
<td>System properties</td>
<td>NS</td>
<td>NS</td>
<td>S. supp.</td>
<td>S. supp.</td>
</tr>
</tbody>
</table>

\(^a\) Marginally supported.

\(^b\) Strongly supported.

\(^c\) Not supported.

\(^d\) Moderately supported.
Examining the hypotheses from the system output effectiveness perspective reveals some interesting alternative findings. The achievement of purpose and efficiency dimensions of system output effectiveness were substantively "explained" by all of the system constructs. Of these two, achievement of purpose was involved in the more strongly supported hypotheses. The approval dimensions were less strongly associated with the system constructs, with vertical suprasystem approval revealing only one statistically significant relationship with the organizational environment construct. As approval is an aspect of effectiveness endemic to the GST perspective, the lack of supportive relationships is disappointing. The system constructs were simply not useful in explaining these forms of effectiveness. At least two interpretations of the findings related to approval are possible.

The first is that GST or the present researcher's explication of GST is incorrect in identifying vertical and horizontal suprasystem approval as components of system output (and organizational) effectiveness. This explanation seems plausible, especially in view of the low intercorrelations observed among the effectiveness dimension measures. At any rate, it is apparent that approval dimensions and achievement-efficiency dimensions are differentially related to other system constructs and that they should be analyzed separately in future investigations. The second possible explanation is that the concepts selected to represent each of the system constructs are inadequate for explaining approval. It should be recalled that the constructs are maintained only to be represented and not completely defined by the incorporated
concepts. There is no clear way to evaluate the extent to which the constructs are inappropriately represented in this research. It may be useful, however, to examine the degree to which the theoretically grounded bivariate hypotheses are supported when approval dimensions are involved, vis-a-vis the assessments rendered for achievement and efficiency. In the next section, the relationships between the system concepts and the recognized aspects of effectiveness are discussed.

Evaluation of Hypotheses Relating System Concepts and System Output Effectiveness

The purpose of this section is to describe the findings related to the fifty-six subgeneral hypotheses formulated in Chapter II. These hypotheses are evaluated by reporting the zero-order Pearson product-moment correlations between each of the system concept measures and the measures of system output effectiveness. The empirical data describing these findings are presented in Tables 4.3 through 4.6 and are summarized in Table 4.8.

As in the previous section, the reporting of findings related to a large number of hypotheses can become tedious unless a summarizing format is adopted. Since the concepts are grouped within the four system construct designations, this organizing framework is retained. The subgeneral hypothesis associated with each concept is restated at the abstract level and implicitly incorporates the four aspects of effectiveness recognized in this research. As before, differences in the findings related to each aspect of effectiveness will be emphasized in the text discussion.
Table 4.8. Summary matrix describing substantive evaluation of the 56 subgeneral hypotheses

<table>
<thead>
<tr>
<th>Organizational concepts</th>
<th>System output effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vertical suprasystem approval</td>
</tr>
<tr>
<td>Environmental instability</td>
<td>NS</td>
</tr>
<tr>
<td>Level of skills</td>
<td>Mod. supp.</td>
</tr>
<tr>
<td>Level of experience</td>
<td>NS</td>
</tr>
<tr>
<td>Perceived resource support</td>
<td>NS</td>
</tr>
<tr>
<td>Socialization</td>
<td>NS</td>
</tr>
<tr>
<td>Communication</td>
<td>NS</td>
</tr>
<tr>
<td>Commitment</td>
<td>NS</td>
</tr>
<tr>
<td>Vertical suprasystem feedback</td>
<td>NS</td>
</tr>
<tr>
<td>Horizontal suprasystem feedback</td>
<td>Marg. supp.</td>
</tr>
<tr>
<td>Negentropy</td>
<td>NS</td>
</tr>
<tr>
<td>Internal integration</td>
<td>NS</td>
</tr>
<tr>
<td>Vertical external integration</td>
<td>NS</td>
</tr>
<tr>
<td>Horizontal external integration</td>
<td>NS</td>
</tr>
</tbody>
</table>

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^a Moderately supported.
^b Marginally supported.
^c Strongly supported.
^d Not supported.
Organizational environment

Two concepts are included within the environmental construct, perceived environmental uncertainty and environmental instability. They are represented by the following subgeneral hypotheses:

S.H.1.1: Perceived environmental uncertainty is negatively related to system output effectiveness.

S.H.1.2: Environmental instability is negatively related to system output effectiveness.

The perceived environmental uncertainty (PEU) hypothesis was overwhelmingly supported by the research findings. It was strongly supported when effectiveness was defined as achievement (r=-.41), moderately supported when defined as vertical suprasystem approval (r=-.26), and marginally supported when examined in relationship to horizontal suprasystem approval (r=-.23) and efficiency (r=-.20). PEU has the distinction of being the only system concept manifesting a theoretically predicted relationship with each effectiveness measure. These findings can be interpreted to mean that higher levels of PEU have an adverse effect on system output (organizational) effectiveness (see Table 4.3).

The empirical evidence surrounding environmental instability (EI) and the various measures of system output effectiveness suggests that there is no relationship between EI and effectiveness. None of the correlations were statistically significant or had an absolute value greater than .10. It is concluded that the degree of turnover among the selected demographic environmental elements is unrelated to system output (organizational) effectiveness.

In terms of future effectiveness inquiry, it is recommended that
PEU continue to be used to represent the environmental construct and that EI be deleted and replaced by other environmental concepts (see Aldrich, 1972 for suggestions). An implication of these findings which merits further investigation is the relationship between perceived or subjective environmental measures (e.g., PEU) and more objective environmental measures (e.g., EI). In this study, these two types of measures manifested differential relationships with system output effectiveness, concomitantly indicated by a low correlation (r=.10) with each other. Determining how to treat subjective and objective measures of what is theoretically contended to be the same (or similar) phenomenon will require intensive work. In the next subsection, the findings related to the inputs concepts are presented.

**Inputs**

There are three concepts within the inputs construct. They are identified in the following subgeneral hypotheses:

- S.H.2.1: Level of skills is positively related to system output effectiveness.
- S.H.2.2: Level of experience is positively related to system output effectiveness.
- S.H.2.3: Perceived resource support is positively related to system output effectiveness.

Both the proposition involving level of skills and the proposition related to level of experience were generally unsupported in this research. The relationships between level of skills and vertical suprasystem

2Zero-order correlations among all research variables are available in Tables B.9 and B.10, Appendix B.
approval ($r = .23$) and between level of experience and efficiency ($r = .15$) were the only theoretical linkages supported by the empirical findings. The lack of overall support for these two subgeneral hypotheses is additionally underscored by the presence of two nonsupportive correlations indicative of inverse relationships. Level of skills was observed to be negatively related to horizontal suprasystem approval ($r = -.15$) while level of experience demonstrated an inverse relationship with achievement of purpose ($r = -.12$). These findings run counter to previous theory and research linking concepts involving skills and experience to effectiveness (Georgopoulos, 1974; Bidwell and Kasarda, 1975; Mott, 1972). As was noted in the general discussion of the inputs construct, the importance of inputs as a determinant of effectiveness may be overestimated. The level of skills and level of experience correlations with effectiveness support this contention (see Table 4.4).

Perceived resource support (PRS) manifested mixed findings, with support for the subgeneral hypothesis contingent on the type of effectiveness examined. The relationships between PRS and achievement of purpose ($r = .24$) and between PRS and efficiency of the output process ($r = .27$) were moderately supported. The relationships between PRS and the two forms of approval were not statistically significant ($r_s = -.01, -.03$), indicating a lack of support for the subgeneral hypothesis. It is concluded that PRS is positively related to system output effectiveness when effectiveness is conceptualized as achievement of purpose or efficiency.

In subsequent investigations of effectiveness using the inputs
construct, alternate concepts should be explored. Perceived resource support might be retained, though when achievement and efficiency constitute the research interest. The overwhelming lack of support for relationships between inputs concepts and effectiveness dimensions (i.e., only 4 of 12 hypotheses were supported), however, infers that the underlying theoretical rationales which associate high levels of skills, experience, and resources with high effectiveness are incorrect, or at least overstated. A reconsideration of the role of inputs in organizational systems analysis would seem appropriate. The next subsection describes the findings related to throughputs concepts.

**Throughputs**

Throughputs are represented by the concepts of socialization, communication, and commitment. These concepts are posited to be related to system output effectiveness in the following manner:

- **S.H.3.1:** Socialization is positively related to system output effectiveness.
- **S.H.3.2:** Communication is positively related to system output effectiveness.
- **S.H.3.3:** Commitment is positively related to system output effectiveness.

The hypothesis indicating a positive relationship between socialization and system output effectiveness was generally supported in this research. The relationship was moderately supported when effectiveness was conceptualized as horizontal suprasystem approval ($r = .28$) or as efficiency ($r = .29$). It was marginally supported under the achievement of purpose dimension of effectiveness ($r = .24$). The relationship was not supported,
however, under the vertical suprasystem approval conceptualization. It is concluded that the subgeneral hypothesis was confirmed, for the most part, and that higher levels of socialization are associated with higher levels of effectiveness. In view of such support, socialization should be retained in future explications of the throughputs construct.

In contradistinction to the general support accorded to the previous hypothesis, the proposition linking communication and system output effectiveness was supported in only one effectiveness area. The relationship between communication and achievement of purpose was moderately supported ($r = -0.28$) while the remaining correlations were statistically nonsignificant ($r_s = -0.04, 0.05, -0.14$). Taken together, these findings reveal that there is no consistent relationship between communication and system output effectiveness and that the subgeneral hypothesis is generally not supported. In addition, these findings related to communication and effectiveness cast doubt on its probable utility in subsequent effectiveness studies, except perhaps when achievement is the sole concern.

The final concept used to represent the throughputs construct is commitment. Commitment and system output effectiveness were found to manifest a moderately supported relationship when effectiveness was defined as horizontal suprasystem approval ($r = 0.26$) and a marginally strong relationship when effectiveness was defined as achievement of purpose ($r = 0.19$). The relationship between commitment and vertical suprasystem
approval was statistically nonsignificant, though in the predicted direction (r=.11). Finally, the relationship between commitment and efficiency (of the output process) was also statistically nonsignificant, but in the opposite direction hypothesized (r=-.18). If such a value were significant, it would infer that lower levels of commitment promote higher levels of efficiency. It is concluded that commitment is positively related to the horizontal suprasystem approval and achievement of purpose dimensions of effectiveness and that commitment may be negatively related to the efficiency aspect of effectiveness. The overall evaluation of the subgeneral hypothesis is thus contingent on the type of effectiveness under consideration. System properties are discussed next.

**System properties**

Six concepts are included with the system properties construct. They are identified in the following six subgeneral hypotheses:

S.H.4.1: Vertical suprasystem feedback is positively related to system output effectiveness.

S.H.4.2: Horizontal suprasystem feedback is positively related to system output effectiveness.

S.H.4.3: Negentropy is positively related to system output effectiveness.

S.H.4.4: Internal integration is positively related to system output effectiveness.

S.H.4.5: Vertical external integration is positively related to system output effectiveness.

S.H.4.6: Horizontal external integration is positively related to system output effectiveness.
The vertical suprasystem feedback (VSF) hypothesis was generally supported under two conceptualizations of system output effectiveness and not supported in the remaining two. The correlation between VSF and achievement of purpose was .35 while the correlation between VSF and efficiency was .29. Although in the predicted direction, the relationships between VSF and the two approval dimensions were not statistically significant ($r_s = .05, .08$). These findings can be interpreted to mean that higher levels of VSF are associated with greater levels of achievement and efficiency and that VSF is useful in studies which emphasize these dimensions of system output effectiveness (see Table 4.6).

The horizontal suprasystem feedback (HSF) hypothesis was generally supported by the research findings. It was marginally supported when effectiveness was defined as vertical suprasystem approval ($r = .20$) or horizontal suprasystem approval ($r = .22$) and strongly supported when examined in relationship to achievement of purpose ($r = .45$). However, in the case of efficiency, a major unanticipated finding was recorded. The correlation between HSF and efficiency was -.42, indicating that higher levels of HSF are associated with lower levels of efficiency. These findings illustrate the need for researchers and practitioners to identify all of the relevant dimensions of effectiveness which interest them. While higher HSF appears to facilitate approval ratings and achievement, it seems to incur a concomitant loss in efficiency. Recognition of this negative, latent function of HSF is important because GST scholars and organizational researchers have tended to stress the importance
of feedback to smooth organizational functioning without reservation (e.g., Homans, 1950; Katz and Kahn, 1966; Thompson, 1967; Berrien, 1968; Blau, 1970; Hage, 1972, 1974; and van Gigch, 1974). It would appear that the relationship between HSF and system output effectiveness is extremely dependent on the aspect of effectiveness under scrutiny. Given the comparatively high magnitudes of the observed correlations (i.e., .20 to .45), the HSF concept certainly merits further exploration in effectiveness research.

The third system property, negentropy, was hypothesized to be positively related to the various measures of system output effectiveness. This relationship was found to be supported in only one instance. The correlation between negentropy and horizontal suprasystem approval was .15 and was interpreted as evidence of marginal support for the subgeneral hypothesis. None of the remaining correlations was statistically significant ($r_s = .01, -.04, .02$). It is generally concluded that negentropy is unrelated to system output effectiveness and that in subsequent investigations, other system properties should be examined.

Like negentropy, the system property of internal integration was found to be significantly related to only one aspect of system output effectiveness. The relationship between internal integration and achievement of purpose ($r = .36$) was strongly supported, however, and infers that high levels of integration within an organizational system are associated with high levels of achievement. The lack of support for a positive relationship between internal integration and the other dimensions of effectiveness is surprising in view of the number of strong arguments
which have been made concerning the importance of integration (e.g., Pennings and Goodman, 1977; Mott, 1972; Lawrence and Lorsch, 1967). The only really reasonable alternative explanation is that the sample of organizational systems studied here is somehow unique. It may be, for example, that the relatively discrete nature of the organizational activities conducted within county Extension organizations requires little integration among county-level staff. The conclusion drawn relative to these findings on internal integration is that there is a positive relationship between internal integration and achievement of purpose and no relationship between internal integration and the other three dimensions of effectiveness. Future investigations, however, might still incorporate internal integration in order to further substantiate the validity of the findings reported here.

Vertical external integration (VEI) manifested mixed findings, with support for the subgeneral hypothesis contingent on the type of effectiveness examined. The relationship between VEI and achievement of purpose was strongly supported \( r = .44 \) while the relationship between VEI and horizontal suprasystem approval was moderately supported \( r = .22 \). The relationships between VEI and efficiency and between VEI and vertical suprasystem approval were not statistically significant, indicating a lack of support for the subgeneral hypothesis \( r_s = -.02, -.01 \). It is concluded that VEI is positively related to system output effectiveness when effectiveness is conceptualized as achievement of purpose or horizontal suprasystem approval. Subsequent studies of effectiveness would benefit from retention of VEI when these two dimensions are of interest.
The final system property examined in conjunction with system output effectiveness was horizontal external integration (HEI). This concept demonstrated the same pattern of relationship with effectiveness as vertical external integration. The relationship between HEI and achievement of purpose was strongly supported (r = .59) and the relationship between HEI and horizontal suprasystem approval was marginally supported (r = .17). The relationships between HEI and the other two effectiveness dimensions were not statistically significant, though they were in the predicted direction (r_s = .12, .13). It is concluded that high levels of HEI are associated with high levels of achievement of purpose and horizontal suprasystem approval and that the subgeneral hypothesis is supported under these conceptualizations of effectiveness. In addition, future effectiveness studies should retain HEI when achievement and horizontal approval are of interest.

Summary of the relationships between system concepts and system output effectiveness

The summary matrix presented in Table 4.8 describes the substantive evaluation of the fifty-six subgeneral hypotheses reviewed in this section. Of these fifty-six hypotheses, only one tenth (6) were strongly supported. Eleven hypotheses were moderately supported while eight were marginally supported. Over half of the subgeneral hypotheses (31) were not supported. Very few of the nonsupported relationships, however, manifested statistically significant correlational values in the direction opposite to that hypothesized. Typically, the nonsignificant correlations approximated zero, indicating no relationships between the focal
concepts. Such a large number of unsupported hypotheses reflects the exploratory nature of this research and emphasizes the need for greater theoretical refinement of the proposed linkages. Toward this end, recommendations were made concerning which concepts should be retained in subsequent effectiveness analyses. In addition, several insights can be gained from inspection of the distribution of supported and unsupported hypotheses.

The proportion of unsupported hypotheses within a system construct designation, for example, was approximately equal. The organizational environment, inputs, throughputs, and system properties each were characterized by unsupported concept findings in 50-67% of their subgeneral hypotheses. Inspection of the findings by concept, however, reveals some wide differences in the number of supported relationships associated with each concept (see Table 4.8). Environmental instability, for instance, was not significantly related to any of the system output effectiveness measures in the predicted direction. Perceived environmental uncertainty, on the other hand, was significantly related to all four effectiveness areas in the manner predicted. Varying degrees of support were manifested in the remaining relationships. Level of skills, level of experience, communication, negentropy, and internal integration were empirically supported in conjunction with only one area of effectiveness.

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3 This does not mean that all of the system constructs were equally useful in explaining system output effectiveness. The relative variances and intercorrelations among systems concepts affect the degree to which a construct, as defined by the concepts included, is associated with effectiveness.
Perceived resource support, commitment, vertical suprasystem feedback, vertical external integration, and horizontal external integration, demonstrated hypothesized and statistically significant relationships in two effectiveness areas. Finally, socialization and horizontal suprasystem feedback were significantly related to three of the effectiveness areas in the manner predicted.

In contrast to this horizontal review of the concept findings, the relationship between the concept measures and the measures of system output effectiveness can be summarized vertically (i.e., from the system output effectiveness perspective). The number of supported findings associated with the system concepts was not evenly distributed across the four effectiveness areas. Vertical suprasystem approval displayed the greatest concentration of unsupported hypotheses (i.e., only 3 of the possible 14 hypotheses were supported) while achievement of purpose received the largest number of empirically endorsed relationships (i.e., 10 of the 14 hypothesized relationships were supported). The number of supported findings associated with horizontal suprasystem approval (i.e., 7) and efficiency (i.e., 5) was approximately equal. Thus if the four effectiveness dimensions were to be ranked according to the number of supportive hypotheses in which they were present, achievement of purpose would be ranked first, followed by horizontal suprasystem approval, efficiency, and vertical suprasystem approval. From a theoretical point of view, the evidence indicating greatest support for hypotheses evaluated under the achievement of purpose dimension of effectiveness is not surprising. Achievement of purpose or goal attainment is the most
The final implications of these findings are discussed in the following chapter.
CHAPTER V. SUMMARY AND IMPLICATIONS

The purpose of this chapter is to summarize the research conducted, identify some of the limitations associated with the study, and to extract and discuss some of the substantive implications of the research findings. Throughout the chapter discussion, recommendations for forthcoming applications of general systems theory (GST) to organizational theory and research are made. In addition, a number of suggestions concerning the future study of organizational effectiveness are offered.

Summary

This dissertation describes a theoretical explication and empirical examination of a general systems model of organizational effectiveness. The research was intended as an exploratory, model building effort, designed to provide baseline empirical knowledge concerning the applicability of GST to organizational inquiry. The underlying impetus behind this study was the belief that a deductive application of GST to organizational research might prove to be a useful theoretical framework for understanding organizations and that such an application might resolve some of the long standing problems associated with the study of organizational effectiveness. In this section, the research efforts made in the theoretical explication and empirical evaluation of GST principles, constructs, and concepts at the organizational level are reviewed.

The general objective of this research was to design and conduct an empirical study of open systems using a general systems perspective.
Organizations were selected as the open system of interest because they have often been identified as a unit likely to benefit from an examination based on GST principles (Scott, 1961). In addition, complex organizations are a specifically recognized type of system within GST taxonomies. The theoretical suitability of a link between the GST conceptual structure and the study of organizations has thus been posited as a natural "match" and a logical entry point for subsequent research. The extent to which the delineated general objective was achieved can be assessed by reviewing the research activities conducted in conjunction with the six specific research objectives stated in Chapter I.

Objective 1 was: To theoretically identify and explicate general systems constructs and concepts applicable to open systems. In Chapter II, the initial premise was developed that an organization could be conceptualized as a type of open system engaged in input, throughput, and output functions. Relevant theory and research endorsing this image of organizations was reviewed. As GST stresses the importance of the environment and the holistic nature of systems, organizational environment and system properties components were added to the conceptualization. Taken together, these five functions and components (i.e., organizational environment, inputs, throughputs, system properties, and outputs) were designated as organizational construct categories and proposed as a systemic model of complex organizations (see Figure 2.2, p. 25). The output construct was subsequently explicated to refer to system output effectiveness, and at an even more ordinary level, to organizational effectiveness. This explication was designed to permit the empirical evaluation
of the derived model in conjunction with a substantive issue within organizational inquiry (i.e., the study of organizational effectiveness).

Following the development of the expanded input-throughput-output model, the heritage of each construct within GST and organizational research was summarized as well as past evidence of the construct's relationship with system output and/or organizational effectiveness. Concepts indicative of each construct were then similarly identified and discussed. For the most part, concepts were selected on the basis of past research or theory suggesting a relationship between the concept and organizational effectiveness. Finally, the posited relationships between the system constructs and effectiveness and between the system concepts and effectiveness were formally integrated into 72 hypothesis statements in order to provide structure to the essentially exploratory research.

Two limitations of the identification and explication process followed in this research can be observed. The first is related to the use of an intratypical sampling frame (i.e., the use of a homogenous set of organizations as the sample--see Kimberley, 1977). This sampling strategy precluded the examination of structural sorts of organizational properties such as size, span of control, level of centralization, etc. These kinds of properties need to be taken into account during subsequent applications of GST to the study of organizations. Beyond this, the concepts selected as representative of each construct should be expanded. This observation points to a second limitation. The present inability
of researchers to completely specify the constituent concepts of organizational system constructs and to outline the causal ordering among these constructs prevents the use of causal modeling analysis techniques. These techniques would be considerably useful in unraveling the complex interrelationships among system constructs. The application of these techniques, however, is contingent on both greater theoretical refinement of systems notions and empirical research. Hence, this entire area of inquiry exemplifies one that is dependent on a careful and simultaneous integration of theory and research.

Objective 2 was: To develop measures of general systems concepts applicable to open systems. The discussion of the measures devised for each system concept was presented in Chapters III and IV. The validity of each measure was judged to be adequate on the basis of conceptual evidence. Reliability was evaluated using the equivalence and accuracy approaches. All but one of the system measures demonstrated an acceptable level of reliability based on the equivalence approach (i.e., only one measure, efficiency of the output process, manifested an internal consistency reliability estimate of less than .60). The evidence related to the accuracy approach provided additional support for the reliability of the measures. At least some of the variance in each multiple item measure was attributed to true score variance. It was concluded that the measures developed in this research were sufficiently valid and reliable for hypothesis evaluation purposes and for subsequent research endeavors in similar organizations.

One limitation of the measures developed in this study is that they
are not highly generalizable to other sorts of organizations. Many of the items are worded such that they are applicable only in educational or service-related organizations. This limitation is not viewed as a serious one as it represents a common tradeoff in social science research (i.e., internal validity is often emphasized rather than external generalizability). In addition, future researchers might attempt to improve the reliability of some measures by increasing the number of items in the smaller (i.e., two and three item) scales, provided they can retain the appropriate content and interrelationships among the items.

Objective 3 was: To theoretically and empirically develop system output effectiveness and organizational effectiveness by relating these two constructs to each other within a general systems perspective and by examining the interrelationships among the variable measures of their component concepts. In Chapter II a rationale for conceptualizing organizational effectiveness as a less abstract form of system output effectiveness was developed. It was also argued that GST provides a unique set of criteria for the evaluation of organization effectiveness and that the use of these theoretically identified criteria might alleviate some of the problems associated with the study of organizational effectiveness. In addition, it was thought that the use of such a standard set of effectiveness criteria would promote generalizability and interorganizational (intersystem) comparisons, resolve the issue of incompatible criteria, and provide an unambiguous way of separating effectiveness determinants from effectiveness dimensions. These criteria
(i.e., vertical suprasystem approval, horizontal suprasystem approval, achievement of purpose, and efficiency of the output process) were discussed at systemic and organizational levels of analysis.

Four measures of organizational effectiveness designed to correspond to the GST oriented criteria were developed, namely vertical suprasystem approval, horizontal suprasystem approval, achievement of purpose, and efficiency of the output process. These measures were fully described in Chapters III and IV. All four measures generally demonstrated adequate validity and reliability, with only the efficiency measure failing to meet the designated standard for internal consistency reliability.

An empirical assessment of the zero-order correlations among the four effectiveness measures revealed that the measures did not covary together in a manner indicative of convergent validity. The intercorrelations ranged from -.05 to .30 (see Table 4.2, p. 138). Because these effectiveness measures did not manifest evidence of convergent validity, it was concluded that the conceptualization of system output (organizational) effectiveness explicated and operationalized in this study did not meet the empirical standards associated with recognition of a multidimensional concept. This means that one should not anticipate that systems or organizations which are effective in one performance area (e.g., efficiency) will necessarily be effective or ineffective in other performance areas (e.g., goal attainment, community approval of activities, superordinate approval of activities).

Objective 4 was: To theoretically and empirically identify some holistic properties of open systems. System properties were discussed
in Chapter II as analytical characteristics of open systems which de-
scribe the system as a whole. Proponents of system properties contend
that they are important because they (1) provide a conceptual category
for describing emergent properties associated with organizational func-
tioning, (2) are a means of incorporating concepts indicative of the
interrelationships and interdependence among organizational components,
and (3) act to reaffirm the importance of viewing an organization as a
holistic unit. The system properties construct was also hypothesized to
have an impact on system output effectiveness. The concepts selected
as holistic properties of open systems were chosen on the basis of prior
recognition as an attribute of open systems, following Katz and Kahn
(1966), and by the existence of theory and research linking the property
to effectiveness. The concepts identified were vertical suprasystem
feedback, horizontal suprasystem feedback, negentropy, and dynamic
homeostasis. Dynamic homeostasis, or a system's ability to maintain
its fundamental character over time, was further explicated into internal
integration, vertical external integration, and horizontal external
integration. The measures devised for these six concepts were presented
in Chapter III and observed to be highly reliable in Chapter IV (i.e.,
all measures manifested an internal consistency reliability estimate of
at least .82 and were characterized by a statistically significant amount
of true score variance).

A major limitation associated with holistic system properties is
their lack of prior theoretical and empirical consideration by organiza-
tional researchers. The ideas represented by system properties are
relatively new and hence untested. There are problems with the system properties conceptualization (see Implications, below) that need to be resolved and this research is viewed as a preliminary step toward such resolution. However, until further documentation of the empirical utility of the system properties notion is established, the explicated concepts should be regarded as tentative and subject to expansion. The present researcher is optimistic that future research will provide support for the importance and utility of system properties for understanding organizational systems.

Objective 5 was: To theoretically and empirically examine the relationship between each construct category (i.e., environment, inputs, throughputs, system properties) and dimensions of system output effectiveness. The theoretical and empirical evidence regarding the relationship between each construct category and system output effectiveness was presented in Chapter II. Based on this evidence sixteen hypotheses describing the relationships between system constructs and effectiveness were formulated. These hypotheses were empirically evaluated in Chapter IV by reporting and substantively interpreting the multiple correlation coefficient describing the relationship between each construct and each dimension of system output effectiveness.

Eleven of the sixteen construct hypotheses received at least some support, with the organizational environment construct manifesting the most utility in explaining all forms of effectiveness (see Table 4.7., p. 150). The inputs construct was evaluated as the least useful in explaining effectiveness, demonstrating only a marginally supported
relationship with achievement of purpose and efficiency of the output process. Throughputs were significantly related to horizontal supra-system approval, achievement of purpose and efficiency of the output process. The system properties construct was strongly supported in conjunction with achievement of purpose and efficiency. These latter findings indicating the utility of the system properties construct in explaining effectiveness were interpreted as legitimizing evidence for the inclusion of system properties in subsequent organizational research. Inspection of the construct findings from the effectiveness perspective revealed that the achievement of purpose and efficiency dimensions were substantively "explained" by all of the system constructs while the two approval dimensions were only minimally explained by the system constructs. It was concluded that the approval dimensions and the achievement-efficiency dimensions are differentially related to the system constructs and that they should be analyzed separately in future investigations.

The limitations connected with this research objective are combined and presented with those associated with Objective 6.

Objective 6 was: To theoretically and empirically examine the relationship between each of the concepts representing a construct category and dimensions of system output effectiveness. Theoretical and empirical evidence pertaining to linkages between system concepts and system output effectiveness were reviewed in Chapter II. Fifty-six hypotheses were constructed and empirically evaluated in Chapter IV using zero-order correlation coefficients. Twenty-five of these hypotheses were
substantively confirmed. Of the thirty-one hypotheses nonsupported hypotheses, few manifested statistically significant correlational values in the direction opposite to that hypothesized. Such a large number of unsupported hypotheses was regarded as a reflection of the exploratory nature of the research and the need for greater theoretical refinement among the proposed linkages. In addition, Boswell (1973) has pointed out that where there are a large number of variables capable of influencing effectiveness, there is little reason to believe that one particular variable, by itself, will have a strong effect. The results of the hypothesis evaluation procedures were summarized in Table 4.8 (p. 153), and are highlighted in the following review.

Most of the system concepts manifested differential relationships to the four types of effectiveness studied. Only one concept, perceived environmental uncertainty, demonstrated a consistent, inverse relationship with each of the effectiveness dimensions. Socialization and horizontal suprasystem feedback were the next most consistent concepts, with each being positively and significantly related to three effectiveness areas. Perceived resource support, commitment, vertical suprasystem feedback, vertical external integration, and horizontal external integration manifested hypothesized and statistically significant relationships in two effectiveness areas. Finally, level of skills, level of experience, communication, negentropy, and internal integration were empirically supported in conjunction with only one area of effectiveness while environmental instability was not significantly related to any of the effectiveness measures in the predicted direction. The evaluation of the
concept findings from the effectiveness dimensions perspective indicated that achievement of purpose was involved in the greatest number of empirically supported hypotheses, followed by horizontal suprasystem approval, efficiency, and vertical suprasystem approval.

Additional Limitations

Several additional limitations of this study can be delineated which could effect the interpretation of the findings associated with Objectives 5 and 6 and the study in general. The first of these is related to the general notion of validity and is known as "semantics" (Hills, 1959). Semantics refers to the idea that whenever highly abstract constructs and concepts are explicated to lower levels of abstraction, the opportunity for explication error occurs (see also Ross, 1957). Expressed another way, as an abstraction which can be applied to a broad class of situations is moved closer to an empirical referent, the probability that the meaning sphere represented by the abstraction is no longer accurately depicted increases. To the extent that these errors have been introduced into this research, the findings are subject to error. Additional research aimed at documenting the construct validity of the abstractions used in this study would reduce the severity of this limitation.

A second limitation of the findings is related to the sample of organizations used in the study. While the hypothesis findings were discussed at the organizational system level, only one particular type of organization was sampled (i.e., local Extension Service units). This
research requires replication with other types of organizations. This limitation should not be underestimated, however, as many organizational scholars (e.g., Cyert, 1975; Dubin, 1976) contend that certain classifications of organizations are fundamentally different and require separate theoretical explanations and/or treatments.

The final limitation concerns the nature of the relationships among the variables investigated in this study. The hypotheses evaluated did not distinguish between cause and effect, although there was a natural tendency to identify the effectiveness variables as dependent variables. A longitudinal research design, with its ability to make stronger causal inferences because of the temporal sequence, would strengthen the argument for causal connections among the variables related in the hypotheses. Such a design, however, would still not necessarily qualify as definitive evidence of causality. Other factors could intervene during the time lag which effect the hypothesized relationships, or, an observed correlation could ultimately be shown to be a function of some third variable(s) (i.e., spurious). Beyond this, the conceptual structure of GST suggests that cause and effect ideas are exceedingly complex and may not even be applicable to systems analyses. A consequence of this limitation is that researchers should exercise care in the policy recommendations and theoretical inferences they draw on the basis of the research findings. In the next section, some of the implications of these research findings are extracted and discussed.
Implications

The implications of the study findings are addressed at three levels, the theoretical, the methodological, and the applied. Within the discussion of the theoretical implications, remarks are directed toward implications for GST and implications for organizational effectiveness.

Implications for GST in organizational inquiry

This study represents one of the few empirical studies conducted that attempts to use GST as more than an organizing framework. The conventional input-throughput-output model of organizations was modified and expanded to more accurately reflect the tenets of GST. More specifically, environmental and system properties constructs were incorporated into the model. These constructs and their constituent concepts, which are directly attributable to GST, displayed some of the strongest relationships to system output effectiveness and thereby have served to increase understanding of effectiveness. In addition, environmental and holistic system properties represent classifications of variables which organizational scholars frequently stress but seldom include within their empirical studies (e.g., perceived environmental uncertainty, feedback from extraorganizational sources). The findings of this study indicate that GST has a definite potential for extending our understanding of complex organizations.

There are, however, some unresolved issues associated with the application of GST to organizational research. These issues center
primarily on problems of conceptual clarity. By this it is meant that some of the highly abstract notions of the orientation are difficult to differentiate, particularly in empirical application. Perhaps the best example is depicted in the case of throughputs and system properties. Throughputs of an organizational system were described as structural arrangements and processes whereby inputs are converted into outputs. Throughputs are generally regarded as goal oriented activities which do not necessarily describe the system as a whole. In the past, throughputs have been equated with the "black-box" notion (Berrien, 1968) or otherwise considered as a residual category intended to incorporate any elements not identified as inputs or outputs. System properties were established in order to further explicate this black box notion and as a means of identifying properties of systems emerging from the interaction of more than one system element. System properties were thus defined as analytical characteristics of organizational systems which describe the system holistically and are not necessarily goal related. The distinctions between throughputs and system properties are not difficult to maintain conceptually but are somewhat problematic in practical application. It could be argued that many throughputs, particularly structural variables, describe systems holistically and that certain system properties are influential in the conversion of inputs to outputs. The researcher is hesitant, however, to recommend collapsing the two construct categories because the consideration of throughputs alone (or any singular intermediary category designation) has resulted in an under-emphasis of those concepts contended as representative of system
properties (e.g., feedback, negentropy, and external integration). In addition, it is likely that the ambiguity surrounding the relationship between throughputs and system properties will be reduced through the formulation of more precise, "successive definitions" as more research is conducted in this area (Kaplan, 1964:77). However, it is apparent that greater theoretical clarity among systems constructs and concepts is necessary and that until greater specificity is achieved, this limitation will likely hamper the use of GST within organizational inquiry.

Implications for organizational effectiveness

The findings reported in this study concerning organizational effectiveness revealed that the four identified measures of effectiveness did not covary together in a highly consistent manner. It was concluded that organizational effectiveness did not meet the traditional empirical standards for recognition as a multidimensional concept. This conclusion, in turn, infers that "dimensions" or types of effectiveness may not be parts of a singular theoretical domain. In many ways, this finding is not surprising. Friedlander and Pickle (1968), for example, reported positive but low in magnitude correlations among external and internal assessments of organizational effectiveness. Steers (1975) concluded his review of empirical studies of effectiveness with the remark that many of the purported effectiveness criteria were only distantly related. The most salient implication or issue emerging from these points is whether a general theory of organizational effectiveness is ever likely to be achieved.
Implications for a theory of effectiveness

There is some evidence to suggest that a general theory of organizational effectiveness may not be feasible. It may be that organizations are always working toward diverse ends, therefore precluding general theories, or that ends emphasized are a function of other organizational properties. Many of these latter arguments are based on the notion that organizations do not share a sufficient number of common characteristics to warrant general theories. Some (e.g., Woodward, 1965; Hirsch, 1975a) have suggested that characteristics such as technology and membership in the private or public sector tend to make some organizations more different than alike. Should additional research confirm this idea, a moderator approach to the study of organizational effectiveness (i.e., the development of theories and measures tied to specific categories of organizations and less emphasis on a general theory) might be a reasonable approach to follow. In many ways, this idea reflects the position of contingency theorists (see Duncan, 1973). In the meantime, however, I would propose the adoption of a middle range perspective to the study of organizational effectiveness (Merton, 1967; Mills, 1959).

This recommendation is derived from the observation that neither the highly abstract dimensions identified in the deductive model investigated here nor the grounded dimensions employed by inductive proponents have acquired compelling evidence to support their claims regarding the composition of organizational effectiveness. Rather than to continue to concentrate on the identification of "the" dimensions which define organizational effectiveness, a more pragmatic approach might be to
develop measures for those dimensions which have frequently been identified in past empirical studies. For example, research originating from both deductive and inductive approaches has often included dimensions pertaining to adaptability and some form of productivity. Emphasis should be placed on the development of psychometrically sound measures of these subconcepts that are applicable in diverse organizations. Because these subconcepts exist at a lower level of abstraction (i.e., less meaning is inputted to them), it should be less difficult, though by no means easy, to devise unambiguous behavioral indices for them. In addition, the lower level of abstraction would reduce the number of potential sources of explication error. In short, the strategy calls for a simultaneous consideration of internal and external validity issues. The immediate research goals would be to establish reliable, valid, and generalizable measures for organizational effectiveness subconcepts. Once these subconcept measures were identified and secured, they would become the building blocks for a theory of organizational effectiveness. Should this strategy fail to achieve these objectives, then perhaps we should seriously question the viability of a general theory of organizational effectiveness.

1 This recommended procedure is analogous to the approach followed by industrial psychologists in the study of another multidimensional conceptualization, job satisfaction. Smith et al. (1969) developed a measure of job satisfaction, the Job Descriptive Index, which is composed of five dimensions of job satisfaction: satisfaction with work, supervision, co-workers, promotions, and pay. This instrument has been utilized in various organizational settings with different types of workers, and found to manifest adequate reliability and validity across samples. Because of this, it has been used in the development of general theories about job satisfaction. Some of the dimensions are even recognized as independent concepts and are studied without regard to the others. It seems reasonable to infer that the same kind of success could be achieved in the study of organizational effectiveness.
effectiveness. It would then seem more prudent to relinquish the notion of organizational effectiveness and concentrate on the theoretical development of the subconcepts.

Measurement implications The conceptualization of effectiveness as a nonunitary construct also conveys implications for the future measurement of organizational effectiveness. First, the use of singular measures of effectiveness becomes inappropriate as (1) they are necessarily deficient in that the effectiveness domain is not entirely captured and (2) such a measure implies that an ultimate effectiveness criterion (i.e., a single best measure of effectiveness) is possible. The futility of ultimate criteria was identified and dispelled many years ago by Thomdike (1949). Multiple indices of effectiveness, each reflecting a different aspect or dimension of effectiveness, are the logical alternative. However, in view of the potential incompatibilities among the indices, investigators must resolve how the multiple measures are to be treated.

The first option is to employ a common metric in measuring each of the dimensions, and then to weight and combine the dimensions so they form what is called a composite criterion. This composite criterion is represented by a single score (like an ultimate criterion), but this single score represents the summated effectiveness on each of the separately identified dimensions. Note that this option embodies the theoretical assumptions that (1) it is possible for the organization to be successful in all dimension areas simultaneously and (2) that high achievement in one area can compensate for deficient performances in others. Under other theoretical conceptualizations (e.g., high performance in one area necessarily implies lower performance in others) the second
option is more appropriate. This option is to employ multiple dimen-
sions in measuring the construct but not to combine them in some addi-
tional fashion. In this manner researchers would be interested in a
set of separate criterion scores, as was the case in this research.
Each option has its own advantages and disadvantages.

A composite criterion is empirically easier to work with, but con-
ceptually it is an amalgam of dimensions that have lost their individual
identities. Multiple criteria enhance the comprehension of the effec-
tiveness construct, but can require more elaborate statistical techniques,
such as canonical correlation analysis, in which a set of independent
variables is used to predict the set of effectiveness criteria. While
a controversy still exists regarding which option is better, a partial
resolution of the controversy has been reached (Schmidt and Kaplan, 1971).
When the primary purpose of an empirical investigation is to learn or
comprehend the construct of effectiveness, multiple criteria are pre-
ferred. However, when the goal is one of pragmatic prediction (such as
the awarding of a contract to an organization), the composite criterion
is preferred. The researcher hopes that these measurement implications
will be considered in subsequent investigations.

Implications for research methods

The findings of this study have two implications for research
methods. The first implication concerns the use of techniques aimed at
maximizing mailed questionnaire return response rates. By implementing
the suggestions offered by Linsky (1975) and Dillman (1972), an overall
return rate of 96.5% was achieved. These suggestions included such
practices as precontacting subjects before sending the questionnaire, personalized letters and questionnaires—including original signatures, use of follow-up devices, attractive packaging of questionnaires, use of number identification rather than respondent name, and evidence of sponsorship by a relevant organization. As these techniques were instrumental in the attainment of a comparatively high response rate, it is recommended that these procedures be followed in subsequent research employing mailed questionnaires.

A second implication of this study for research methods is connected with the use of measurement error adjustment techniques. The zero-order correlations utilized in this study were adjusted for measurement error using the correction for attenuation procedure while the multiple correlations were adjusted using the errors-in-variables procedure. Thus the correlations reported in this research reflect the degree of association between the true values of one variable and the true values of another (or set of other) variable(s).

Ascertaining the relationships among true values is both an appropriate procedure and significant advancement for researchers interested in theory building or testing, as opposed to those concerned with offering predictions in terms of a particular set of data. The errors-in-variables procedure adjusts for measurement error, some forms of specification error, and shrinkage (i.e., the number of independent variables and the size of the sample). Multiple correlations adjusted using the errors-in-variable procedure (values reported in Tables 4.3-4.6) can be directly compared with multiple correlations derived through ordinary least
squares procedures, adjusted for shrinkage (values reported in Tables B.5-B.8, Appendix B). A visual inspection of the corresponding multiple correlations within each set of tables reveals that the magnitude of the coefficients adjusted with the errors-in-variables procedure was greater than the magnitude of the coefficients adjusted for shrinkage alone (see Aziz, 1978, and Warren and Faisal, 1978 for more detailed comparisons of results generated under ordinary least squares and errors-in-variables procedures). As researchers have known for quite some time that correlations are attenuated by measurement error but have had no way to adjust for the degree of underestimation (Warren et al., 1977:81), the errors-in-variables adjustment technique may have tremendous utility in areas of inquiry characterized by problems of measurement error. In summary, the errors-in-variables procedure brings us one step closer in our efforts to approximate true values.

The last set of implications to be discussed deals with policy related or applied issues.

**Applied implications**

Although it was not a delineated objective to discuss the applied or policy-related implications of this research, the writer feels that several applied implications are worthy of special consideration. These implications are contended to be applicable to all local Extension Service unit organizations in the United States. The first is the recognition that ES organizations which are effective in one performance area are not necessarily effective (or ineffective) in other areas. The examination of four effectiveness areas in this study indicated that
performance in one area was only slightly related to performance in another area. There was no evidence to suggest that good performance in one area transpires at the expense of good performance in another area. Practitioners cognizant of these points will recognize that all relevant effectiveness criteria must be identified and taken into account before an effectiveness evaluation can be completed. In addition, if an overall evaluation is to be rendered based on various performance areas, then the relative importance attached to each area must be determined in advance. Finally, Extension administrators might wish to be less than sympathetic to arguments defending poor performance in one area because of extra effort diverted to attaining good performance in another area. The evidence reviewed here indicates that successful performance in one area is unrelated or only moderately correlated with performance effectiveness in another area.

A second applied implication of these findings concerns what variables seem to be related to the effectiveness of Extension units. The ambiguous state of cause and effect relationships within systems analyses makes predictions about how changes in one variable might affect other variables rather precarious (see limitation discussed on p. 178). In addition, the lack of longitudinal data combined with the modest magnitude of many of the correlational findings requires that caution be exercised in rendering such predictions. However, by examining some of the variables observed to be strongly related to effectiveness in this research (i.e., bivariate relationships characterized by zero-order correlations $\geq .25$, which are statistically significant at the .01 level),
practitioners may gain some insights into what strategies for improving effectiveness are more likely to succeed.²

This research has demonstrated that organizational effectiveness is more validly depicted when effectiveness dimensions are considered separately. Practitioners interested in promoting the kinds of effectiveness investigated here might begin by attempting to manipulate the variables listed in Table 5.1. This table shows that area level approval of county operations can be improved by decreasing perceptions of environmental uncertainty. Community level approval (i.e., approval of county clientele as represented by the county Extension council chairman) of county operations is likely to be raised by increasing the socialization activities provided to county staff and by sponsoring activities which increase staff commitment to the local Extension organization. The greatest number of recommendations can be offered for improving goal attainment at the county level. Policies with a greater likelihood of success include decreasing perceived environmental uncertainty; increasing communication and integration among county staff; increasing feedback from area sources, the Extension council, and county clientele; and increasing the level of integration between county staff and area staff, the Extension council, and county clientele. Integration, it should be recalled, refers to the degree of interdependence and agreement on values.

²These observations are based on the premise that decision-makers must make decisions regardless of the level of information available to them and that some information is better than none. In addition, it is assumed that decision-makers can draw upon alternate sources of information to supplement these data.
Table 5.1. Policy recommendations for improving effectiveness of local Extension Service organizations

<table>
<thead>
<tr>
<th>Kinds of effectiveness</th>
<th>Area level approval of county operations</th>
<th>Community level approval of county operations</th>
<th>Achievement of goals</th>
<th>Efficiency of county operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Decrease level of perceived environmental uncertainty</td>
<td>(2) Increase level of commitment among county staff</td>
<td>(1) Decrease level of perceived environmental uncertainty</td>
<td>(1) Increase level of perceived resource adequacy</td>
<td></td>
</tr>
<tr>
<td>(1) Increase level of socialization</td>
<td></td>
<td>(2) Increase level of communication among county staff</td>
<td>(2) Increase level of socialization</td>
<td></td>
</tr>
<tr>
<td>(3) Increase level of feedback from area level</td>
<td></td>
<td>(3) Increase level of feedback from area level</td>
<td>(3) Increase level of feedback from area level</td>
<td></td>
</tr>
<tr>
<td>(4) Increase level of feedback from Extension council and county clientele</td>
<td></td>
<td>(4) Decrease level of feedback from Extension council and county clientele</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Increase level of integration among county staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Increase level of integration between county and area staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Increase level of integration between county staff and Extension council; between county staff and county clientele</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The last dimension of effectiveness, efficiency, is facilitated by increasing perceptions of resource adequacy; increasing socialization activities provided to county staff; increasing the amount of feedback from the area level; and decreasing the amount of feedback from the Extension council and county clientele. The latter policy recommendation, to decrease feedback from community sources, is not readily explicable from a theoretical or commonsensical point of view. Perhaps where adequate feedback already exists, additional increments are repetitive or provide only marginally useful information, while absorbing county staff time that could otherwise be put to better use.

In addition to these specific recommendations evident in Table 5.1, some other observations can be made. It should be noted that an increase or decrease in feedback from community sources will likely manifest at least one undesirable effect. That is, increasing such feedback seems to promote goal achievement while adversely affecting efficiency; decreasing such feedback promotes efficiency while reducing goal attainment. This paradoxical situation underscores the importance of anticipating latent outcomes of policy changes in general, and in this case, the importance of deciding which form of effectiveness is the more valued. Finally, it can be observed that not one single policy recommendation identified in Table 5.1 (i.e., modification of any one variable), is likely to have a positive impact on all four effectiveness areas.

In concluding this discussion of applied implications, several remarks are offered pertaining to strategies for improving effectiveness
that are often recommended in labor intensive organizations like Extension. These strategies include (1) the securing of experienced staff (level of experience), (2) maintenance of a low turnover rate (negen-trophy), and (3) the acquisition and retention of skilled staff (level of skills). These variables were observed to be generally unrelated to effectiveness in this research, and were occasionally observed to have a negative impact on some forms of effectiveness. The level of skills variable illustrates the point.

The idea of raising the average educational attainment level among county staff as a possible means for improving organizational effectiveness has often been proposed. This notion is reflected in the level of skills variable (see Table 4.4, p. 143). Inspection of the correlation values linking this variable with effectiveness suggests that this might be a reasonable policy for improving vertical suprasystem (area level) approval ($r = .23$). Level of skills and this form of approval appear to positively covary. However, level of skills is unrelated to achievement and efficiency (values are not statistically significant), and negatively related to horizontal suprasystem (community level) approval ($r = -.15$). Practitioners should recognize that improving educational attainment alone is (a) likely to have a desired impact on only one form of effectiveness and (b) may have an undesired impact on other types of effectiveness. As a result, relevant decision-makers may feel that this strategy is a less than optimal one for improving organizational effectiveness. In this particular case, longitudinal research would be extremely useful in determining the impact of manipulating variables like educational
attainment which are theoretically argued to influence effectiveness.

This discussion of applied implications concludes this dissertation. The researcher is hopeful that the study findings and suggestions for future investigations rendered here will be of service to those who continue to conduct research related to organizational effectiveness and in the broader area of general systems theory.
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Ackoff, Russell L.  

Aiken, Michael and Jerald Hage  

Aldrich, Howard  

Argyris, Chris  

Aziz, Muhammad Amin  

Bakan, D.  

Baker, B. O., C. D. Hardyck and L. F. Petrinovich  

Bakke, E. Wight  

Ball, Richard A.  
Barnard, Chester

Barrett, Jon H.

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Berrien, F. Kenneth

Bertrand, Alvin L.

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Campbell, John P.  

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Child, John  

Chin, Robert  

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Kimberley, John R.

Kluegel, James R., Royce Singleton, Jr. and Charles E. Starnes

Kovener, Anthony R.

Kuhn, Alfred

Labovitz, S.

Landecker, Werner S.

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Likert, Rensis

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Lyden, James Frement  

McNemar, Quinn  

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Merton, Robert K.  

Metcalfe, J. L.  

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Mills, C. Wright  

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Monge, Peter R.

Morrison, Denton E. and Ramon E. Henkel

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Nunnally, J. C.

Olsen, Marvin E.

Pareto, Vilfredo

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Pennings, Johannes

Pennings, Johannes M. and Paul S. Goodman

Phillips, Bernard S.

Phillips, D. C.

Pondy, Louis R.

Price, James L.
Rice, Charles E.

Rice, George H. and Dean W. Bishoprick

Roethlisberger, F. J. and W. Dickson

Ross, Ralph

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Weirath, Tom  

Woodward, Joan  

Young, Robert K. and Donald J. Veldman  

Yuchtman, Ephriam and Stanley E. Seashore  

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support for me, including the research project which generated the data for this dissertation. Dr. Warren and Dr. Faisal rendered excellent methodological assistance while professors Bultena, Rogers, Powers, Richards, and Goudy periodically provided insights and inspiration. Finally I would like to thank Dr. Paul Muchinsky who was far more involved in my training than the typical "outside" committee member. He helped me to keep a balanced perspective during the traditional crisis periods of a graduate career and thus I am especially grateful to him. Concomitantly, there is no one to whom I would accord higher professional respect.

In closing I would also like to thank some of the individuals who attended graduate school with me as my colleagues and friends. John Krol taught me what scholarship means and acted as my first role model. Janet Bokemeier endured the preparations for Qualifying Exams with me, supplying me with unmentionable, possibly immoral, acronyms useful in the recitation of sociological trivia. Bill Lawson and Lacey Tillotson, project co-workers, along with Meridean Maas and Cindy Dobson, provided considerable moral support over the past several years and otherwise served to humanize daily activities. Finally, appreciation is directed toward the Slater-Kelley Superstars for providing the diversionary incentive to complete this dissertation.
APPENDIX A
December 5, 1977

Dear Co-Workers:

As you know, we in Extension are very much interested in how our programs and ways of reaching people at the local level are received today. During our seminar on the assessment of impact last June, it was suggested that we should be obtaining information at the county level and from Extension Council persons about our programs. As a first step in this direction, researchers in the Department of Sociology, who assisted and helped conduct the seminar in June, have developed a questionnaire for CEDs and one for chairpersons of County Councils. These questionnaires will ask about your perceptions of impact at the county level, perceptions of priorities, your views about the functioning of Extension and about your interaction and contacts with area personnel. We are interested in your views because of your position at the county level. You can be assured that your confidentiality will be protected and that nothing you say will ever be associated with you or your position personally. Of course, the same goes for your council chairperson.

We hope that you will cooperate with the researchers by filling out the questionnaire and encourage your council chairpersons to do the same if they have questions. You will receive your questionnaire, in the mail, in a few days. Feel free to call the researchers if you have any concerns about the questionnaires. The researchers will provide us with feedback later during the year. Thank you in advance for your help and cooperation.

Sincerely,

Ronald C. Powers
Assistant Director,
Cooperative Extension Service

RCP/dd
December 5, 1977

Dear Council Chairperson:

We in Extension are very much interested in how our programs and ways of reaching Iowans are received. We think that we can obtain many insights and ideas about Extension by asking people who are involved in Extension at the local level to think about these issues.

Researchers in the Department of Sociology at Iowa State University have developed a questionnaire to be filled out by County Extension Directors and one for County Extension Council chairpersons. The questionnaire, which you will receive in a few days, will ask you to indicate your opinions about programs, priorities, and operations at the local level. Naturally, your confidentiality will be protected and nothing that you say will ever be associated with you as a person. We hope that you will cooperate by filling out the questionnaire. Please feel free to call the researchers in the Department of Sociology if you have questions or if you need some information to help you complete the questionnaire. We will be receiving some feedback from the researchers later this year and we hope that this will be useful as we look ahead. Thank you in advance for your help and cooperation.

Sincerely,

Ronald C. Powers
Assistant Director,
Cooperative Extension Service
December 2, 1977

Dear Co-Workers:

As you know, faculty and staff have been considering alternative ways of obtaining data related to our effectiveness and impact in Extension. A handbook has been completed on ways of obtaining effectiveness and impact information. Those who attended the seminar on assessment and impact last June reviewed the preliminary draft of the handbook and were receptive to the proposal that we try to obtain a variety of types of data related to our impact at the county level. Several participants suggested, including those on the seminar program, that we should be asking council chairpersons what people at the local level know and think about our programs and how we can better meet their needs.

Faculty in the Department of Sociology, in cooperation with ES staff and administrators, have been working on a questionnaire that will be sent to CEDs and council chairpersons of county councils. We wanted to let you know about this study before the CEDs and council chairpersons are contacted.

The questionnaires will ask about perceptions of impact at the county level, how Extension functions and operates at the county level, and about interaction between county staff and area and state staff. Both CEDs and council chairpersons will be assured by the researchers that their confidentiality will be protected and that information provided on the questionnaire will ever be associated with a particular person. You will be sent a copy of the questionnaire that will be sent to CEDs and council chairpersons in order to keep you informed. At a later time, the researchers will be contacting you and ask you to complete a shorter questionnaire. Your questionnaire will be primarily oriented toward your perception of Extension at the local level. We would like to ask you to reassure any CEDs that have questions or feel any concern about the project. The researchers will provide us with feedback later in the year and hopefully we will be able to make use of this in assessing our programs. Feel free to call the researchers and if you have any questions they are Charles Mulford, Richard Warren, and Gerald Klonglan in the Department of Sociology (515-294-8124).

Enclosed are copies of the letters that are being sent to CEDs and council chairpersons. Copies of the questionnaires will be forwarded to you as soon as they are packaged and before they are mailed to the respondents.

Our goal is to send the questionnaires out during the week of December 11-17, 1977. Thank you in advance for your cooperation.

Sincerely,

Ronald C. Powers
Assistant Director,
Cooperative Extension Service
We are writing this letter to ask for your cooperation in our study on Extension in Iowa. As you know, we have been asked to make suggestions about doing evaluation based on our review of work completed by others and, toward that end, we presented a workshop on evaluation with Extension personnel last June 1-2, 1977. This year, Extension administrators have encouraged us to continue our work by using our evaluation model as a guide in obtaining data about the operation of Extension.

This year, we will be trying to find out all that we can about Extension at the County level. We are interested in the County operation in general, not in the work of any particular staff member. We are asking you to complete this questionnaire because of your position and knowledge. While you may think about consulting with other county staff, we hope that you keep this to a minimum. We know how busy life gets at this season, and fear that delays will result unless you fill out the questionnaire quickly and return it to us as soon as possible.

We are sending you this questionnaire, and one to your County chair, in order to obtain both of your ideas and opinions about Extension at the County level. In addition, we will be interviewing all area directors. We hope that by including you, your chair, and your area directors that we will be able to learn a great deal.

Our goals are to find out as much as we can about Extension at the County level in all Iowa counties and to find out how and why counties differ. We will send you a concise summary of key results in the spring. We will also provide others in Extension with feedback during the upcoming year.

Your help will assist us in completing our work and fulfilling our responsibilities on evaluation. We have pretested the questionnaire and think that you should be able to complete it in about 30 minutes. In order for us to meet our work schedule, we hope that you will complete the questionnaire and mail it back to us on or before December 19, 1977.
Of course, nothing that you say will ever be associated with you personally or even with your county. A code number is placed on the questionnaire only to help us keep track of returned questionnaires.

If you have questions about the study, why don't you call or stop by and talk to one of us. We'll be glad to answer any questions that you may have.

In closing, we want you to understand that your participation in this study is voluntary. No one will force you to fill out the questionnaire if you do not wish to do so. But we do wish to point out again just how much we are depending on the help of people like yourself. Thank you in advance for helping us. We really do appreciate it.

Cordially,

Charles L. Mulford  Richard D. Warren  Gerald E. Klonglan
Charles L. Mulford  Richard D. Warren  Gerald E. Klonglan
Professor in Sociology  Professor in Sociology  Professor in Sociology

Enclosure: (1) Questionnaire for CED
You received a communication a few days ago about our research project to assist Extension in obtaining more information about the perceptions that County Extension Council Chairpersons have with regard to the operations and impact of Extension at the county level. Because of the importance of your position on the county Extension council, we are requesting that you complete this questionnaire and return it to us as soon as possible. County Extension Directors and Area Extension Administrators are also cooperating in this work.

Your opinions and ideas about Extension at the county level are very important and a necessary input into program planning, development and implementation. They are also important for developing short courses for Extension professionals and for getting some estimates of Extension's impact at the county level.

Your participation in this research is voluntary but we can't overemphasize the importance of the information that we are asking you to share with us. You can be assured that nothing you say will ever be associated with you as a person or with your county. We have placed a code number on the questionnaire for the purpose of keeping track of the questionnaires that have been returned.

We are aware of your busy schedule but hope that you will find time to fill out the questionnaire and return it to us on or before December 19, 1977. If you have any questions about our work or the questionnaire, please feel free to call us and we will be more than happy to answer your questions.

Thank you in advance for cooperating in this very important research project.

Cordially,

Charles L. Mulford  Richard D. Warren  Gerald E. Klonglan
Professor in Sociology  Professor in Sociology  Professor in Sociology

Enclosure: (1) Questionnaire
Dec. 16, 1977

Dear (personalized salutation)

One week ago I mailed questionnaires to all County Extension Directors in Iowa seeking their opinions of Extension field operations and impact at the county level. I am pleased that so many of you have completed and returned the questionnaire. However, a few of the questionnaires have not been returned. If you have not had an opportunity to complete and return the questionnaire, please do so as soon as possible. If you have misplaced your questionnaire, let me know and I'll send you another right away (515-294-8124).

Thank you for your cooperation,

Charles L. Mulford

Dec. 16, 1977

Dear (personalized salutation)

One week ago I mailed questionnaires to all County Extension Council Chairmen in Iowa seeking their opinions of Extension field operations and impact at the county level. I am pleased that so many of you have completed and returned the questionnaire. However, a few of the questionnaires have not been returned. If you have not had an opportunity to complete and return the questionnaire, please do so as soon as possible. If you have misplaced your questionnaire, let me know and I'll send you another right away (515-294-8124).

Thank you for your cooperation,

Charles L. Mulford
We are sending you this letter to remind you that we need you to complete the questionnaire on County Extension operations and impact. We know how busy you are but hope that you will cooperate in our work. We need to hear from each CED in Iowa and County Council Extension Chairperson.

If you have questions about the study or the questionnaire, please feel free to call me and I will be pleased to talk with you. Again, we would like to remind you that your information will be confidential and no one will ever associate anything that you say with you or your county.

Thank you in advance for helping us complete this work with Extension.

Most cordially,

Charles L. Mulford
Professor
Sociology

CLM:df

Enc.
December 27, 1977

We are sending you this letter to remind you that we have not received your completed questionnaire. We need your opinions and information in order for us to complete our work with Extension.

It is necessary that we hear from each CED and County Extension council chairperson in Iowa. We do know how busy your schedule may be at this time of the year, but we hope that your interest in Extension will encourage you to help us. If you do have any questions about our study or the questionnaire, please feel free to call me.

Cordially,

Charles L. Mulford
Professor
Sociology

CLM:df
Enc.
COUNTY EXTENSION DIRECTORS:

Their Opinions of Extension Field Operations and Impact

A 1977 Survey of Iowa County Extension Offices

BY
IOWA STATE UNIVERSITY
of Science and Technology

Ames, Iowa

Department of Sociology
Agriculture and Home Economics Experiment
Station No. 2271
GENERAL INSTRUCTIONS

Please Read Carefully Before Proceeding

1. Please answer all of the questions asked in the questionnaire, using the answer categories provided. This is the only way that we can insure that the views of your County Extension Service will be recorded. If you wish to qualify your answers in any way, we invite you to do so in the margins, but only after using the answer spaces and categories provided.

2. It is anticipated that the questionnaire can be completed in less than an hour.

3. Nearly all of the questions are concerned with your County Extension Service. As the County Extension Director (key administrative official), we would like for you to represent the professional staff in your county in responding to these questions.

4. Specific instructions are provided at the beginning of each new section. Please read these carefully. NOTE that some questions have several parts to them. Complete all parts of those questions.

5. When you have completed the entire questionnaire you will find that all you need do is:
   A. Close the questionnaire booklet,
   B. Staple the booklet in the places indicated on the back cover,
   C. Mail (postage and addresses have already been provided).

IN ORDER TO AVOID THE HOLIDAY MAIL DELAYS COMMON AT THIS TIME OF YEAR, PLEASE RETURN THE COMPLETED QUESTIONNAIRE ON OR BEFORE
## Section I - Commitment to the County Extension Service

Listed below are questions about the degree of Extension staff involvement in the County Extension Service. We are interested in learning more about the county Extension staff’s identification with their work.

**To what extent:**

1. Do staff members in your county exhibit

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<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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</table>

(a) A belief in the philosophy of the County Extension Service? 1 2 3 4 5 6 7 8 9 10 11

(b) A sense of pride in working for the Extension Service in this county? 1 2 3 4 5 6 7 8 9 10 11

(c) A feeling that the County Extension Service's problems are their problems? 1 2 3 4 5 6 7 8 9 10 11

(d) A willingness to work over-time? 1 2 3 4 5 6 7 8 9 10 11

(e) A strong desire to meet the objectives of the County Extension Service? 1 2 3 4 5 6 7 8 9 10 11

(f) A strong desire to stay with the Extension Service in this county? 1 2 3 4 5 6 7 8 9 10 11

2. Do staff members in your county exert high levels of effort on behalf of the County Extension Service beyond minimal job expectations?

1 2 3 4 5 6 7 8 9 10 11

To a very little extent to some extent to a very great extent
Section II - Resource Adequacy and Problem Solving Ability

The following set of questions concerns your County Extension Service's ability to acquire resources with which to fulfill its mission. Also, there are questions which ask about the ability of the Extension staff to adapt to new ideas, work routines, and changing clientele needs and desires.

To what extent:

1. Does your County Extension Service have a sufficient amount of the following resources to fulfill its mission

   | To a very little extent | To some extent | To a very great extent |
   | (Circle your answer)    |               |
   | (a) Finances?           | 1 2 3 4 5 6 7 8 9 10 11 |
   | (b) Professional Extension personnel? | 1 2 3 4 5 6 7 8 9 10 11 |
   | (c) Volunteer leaders?  | 1 2 3 4 5 6 7 8 9 10 11 |
   | (d) Office (secretarial) personnel? | 1 2 3 4 5 6 7 8 9 10 11 |
   | (e) Office space?       | 1 2 3 4 5 6 7 8 9 10 11 |
   | (f) Equipment?          | 1 2 3 4 5 6 7 8 9 10 11 |
   | (g) Technical expertise in Extension subject matters? | 1 2 3 4 5 6 7 8 9 10 11 |

2. Are individual staff members in your County Extension Service allocated sufficient resources (time, money, equipment, etc.) with which to fulfill their job expectations?

   | To a very little extent | To some extent | To a very great extent |
   | (Circle your answer)    |               |
   | 1 2 3 4 5 6 7 8 9 10 11 |

3. Is your County Extension Service

   | To a very little extent | To some extent | To a very great extent |
   | (Circle your answer)    |               |
   | (a) Capable of coping with emergencies that arise from time to time? | 1 2 3 4 5 6 7 8 9 10 11 |
   | (b) Able to anticipate most clientele needs and desires before they are formally expressed? | 1 2 3 4 5 6 7 8 9 10 11 |
To what extent:

4. Are staff members in your County Extension Service receptive to new ideas and suggestions offered by your

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<th>To a very little extent</th>
<th>To some extent</th>
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<tbody>
<tr>
<td>(a) County clientele?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
</tr>
<tr>
<td>(b) County Extension Council?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
</tr>
<tr>
<td>(c) Area staff?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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5. Is your County Extension Service

<table>
<thead>
<tr>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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<tbody>
<tr>
<td>(a) Losing clientele because other organizations in the county are providing similar educational programs?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
</tr>
<tr>
<td>(b) Losing volunteer leaders to other organizations in the county?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
</tr>
<tr>
<td>(c) Losing professional Extension personnel because they are able to obtain higher salaries from other public or private organizations?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
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</table>

6. Does your County Extension Service receive time and financial support from local organizations and businesses?

<table>
<thead>
<tr>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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<tr>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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7. Do staff members in your County Extension Service readily accept and adjust to changes in their work routines?

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<thead>
<tr>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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<td>1 2 3 4 5 6 7 8 9 10 11</td>
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</table>
Section III - Relationships Among County Staff

This set of questions requests some information about your County Extension staff. We are interested in learning about the working relationships among professional county staff.

1. To what extent do staff members in your County Extension Service

| (a) Plan together and coordinate their efforts where it is feasible? | 1 2 3 4 5 6 7 8 9 10 11 |
| (b) Encourage each other to work as a team on projects of mutual concern? | 1 2 3 4 5 6 7 8 9 10 11 |
| (c) Efficiently organize their work activities? | 1 2 3 4 5 6 7 8 9 10 11 |
| (d) Exchange information about what is going on in their program areas? | 1 2 3 4 5 6 7 8 9 10 11 |
| (e) Interact with each other even off the job? | 1 2 3 4 5 6 7 8 9 10 11 |
| (f) Interact with each other in their daily Extension activities? | 1 2 3 4 5 6 7 8 9 10 11 |
| (g) Agree on what sorts of programs will best meet clientele needs? | 1 2 3 4 5 6 7 8 9 10 11 |
| (h) Agree on clientele needs? | 1 2 3 4 5 6 7 8 9 10 11 |
| (i) Participate in decision making? | 1 2 3 4 5 6 7 8 9 10 11 |
| (j) Prefer to work with other Extension professionals rather than with persons not in Extension? | 1 2 3 4 5 6 7 8 9 10 11 |
Section IV - Relationships with Area Staff

In these questions, we are interested in understanding working relationships between County Extension staff and area level staff. Please answer the following questions about how your county staff and the staff in your area office relate to each other.

To what extent:

1. Are Area level staff receptive to suggestions and ideas offered by staff members in your County Extension Service?

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<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<tbody>
<tr>
<td>Non-receptive</td>
<td>Sometimes receptive</td>
<td>Nearly always receptive</td>
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<td></td>
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</table>

2. Do Area level staff provide enough information and technical assistance for staff members in your County Extension Service to do the best job possible?

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<th>8</th>
<th>9</th>
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<th>11</th>
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<tbody>
<tr>
<td>Difficult to get help</td>
<td>Can always get help from specialists</td>
<td></td>
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<td></td>
<td></td>
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</table>

3. Do staff members in your County Extension Service (Circle your answer)

<table>
<thead>
<tr>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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<tbody>
<tr>
<td>(a) Plan activities and coordinate their efforts with Area staff?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
</tr>
<tr>
<td>(b) Agree with Area staff on clientele needs?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
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<tr>
<td>(c) Agree with Area staff on goals that the County Extension Service ought to pursue?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
</tr>
<tr>
<td>(d) Feel free to disagree with Area staff?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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Section V - Relationships with the Extension Council and County Clientele

This set of questions asks you for some information about your Extension Council and county clientele. We would like to learn more about the relationship between the County Extension Service and these two groups.
To what extent:

1. Is your Extension Council receptive to new ideas and programs developed by staff members in your County Extension Service?

   
   1 2 3 4 5 6 7 8 9 10 11
   
   Non-receptive Sometimes Nearly always
   receptive receptive

2. Does your Extension Council have enough knowledge of county clientele to help your county staff recognize and interpret clientele needs and interests?

   
   1 2 3 4 5 6 7 8 9 10 11
   
   To a very little extent To some extent To a very great extent

3. Does your Extension Council provide information and make suggestions concerning clientele needs and interests?

   
   1 2 3 4 5 6 7 8 9 10 11
   
   To a very little extent To some extent To a very great extent

4. Does your Extension Council agree with staff members in your County Extension Service on

   
   To a very little extent To some extent To a very great extent
   
   (Circle your answer)

   (a) The types of activities and programs that the County Extension Service should develop and implement?

   1 2 3 4 5 6 7 8 9 10 11

   (b) The goals that the County Extension Service ought to pursue?

   1 2 3 4 5 6 7 8 9 10 11

   (c) Priority clientele groups?

   1 2 3 4 5 6 7 8 9 10 11

5. Do clientele in your county agree with staff members in your County Extension Service on

   
   To a very little extent To some extent To a very great extent
   
   (Circle your answer)

   (a) The types of activities and programs that the County Extension Service should develop and implement?

   1 2 3 4 5 6 7 8 9 10 11

   (b) The goals that the County Extension Service ought to pursue?

   1 2 3 4 5 6 7 8 9 10 11
6. Are county clientele receptive to new ideas and programs developed by staff members in your County Extension Service?

1 2 3 4 5 6 7 8 9 10 11
Non-receptive   Sometimes   Nearly always
receptive

Section VI - Daily Work Activities of County Staff

In this section we ask you to respond to questions about the day-to-day work of Extension staff. Our purpose is to learn more about Extension activities at the county level.

How adequate:

1. Is the orientation provided to new Extension Service field staff?

1 2 3 4 5 6 7 8 9 10 11
Rather inadequate   Adequate   More than adequate

2. Is the staff training for updating skills and abilities and for informing field staff about new goal priorities and new procedures.

1 2 3 4 5 6 7 8 9 10 11
Rather inadequate   Adequate   More than adequate

To what extent:

4. Do staff members in your County Extension Service

<table>
<thead>
<tr>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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<tr>
<td>(a) Exchange ideas and opinions with state and area level staff?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td>(Circle your answer)</td>
</tr>
<tr>
<td>(b) Feel pressured to work on programs that they would prefer not to be involved in?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
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<tr>
<td>(c) Feel pressured to work with clientele groups that they would prefer not to work with?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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<tr>
<td>(d) Feel that program expectations between the state and federal level are incompatible?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
</tr>
<tr>
<td>(e) Feel that program expectations between the state level and the Extension Council are incompatible?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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**Section VII - Advisory Groups**

1. We would like to obtain some information related to the volunteer leaders who work in your county. We are especially interested in leader participation and the feedback you receive from the various advisory committees your county may have established; for example, CRD, 4-H, Home Economics, Public Affairs, Livestock, etc. Please estimate, as best you can, the extent of their participation by filling out the information requested below in columns a through d. If the group listed does not exist in your county, draw a line through it.

Then, in columns e and f, try to estimate the frequency and usefulness of the feedback (i.e., suggestions and criticisms) you receive from these advisory groups.

<table>
<thead>
<tr>
<th>(a) Name of Advisory Committee or Group</th>
<th>(b) # of Volunteer Leaders Serving in 1977</th>
<th>(c) # of Volunteer Leaders who were NEW in 1977</th>
<th>(d) # of Volunteer Leaders who chose NOT to Continue in 1977</th>
<th>(e) Frequency of Feedback</th>
<th>(f) Usefulness of Feedback</th>
</tr>
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<tbody>
<tr>
<td>4-H Expansion and (a) Review Committee</td>
<td></td>
<td></td>
<td></td>
<td>In frequent</td>
<td>Very Frequent</td>
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<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
</tr>
<tr>
<td>4-H Volunteer Leaders (b) (Organizational Clubs)</td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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<tr>
<td>Home Economics (c) Program Committee</td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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<tr>
<td>(d) Pork Producers</td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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<tr>
<td>(e) Beef Producers</td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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Please list others below; you need only list the more permanent committees or groups.

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<tr>
<th>(f)</th>
<th>(g)</th>
<th>(h)</th>
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Please list others below; you need only list the more permanent committees or groups.
Section VIII - Participation in Professional and Community Activities

This set of questions is designed to obtain information on the extent of your County Extension staff's participation in professional and community activities.

To what extent:

1. Do staff members in your County Extension Service

(a) Participate in community affairs other than those sponsored by the County Extension Service?  
(b) Participate in state professional associations (related to Extension)?  
(c) Participate in national professional associations (related to Extension)?  
(d) Feel pressured to maintain their "image" as an Extension staff member even when "off-duty"?

To a very little extent  To some extent  To a very great extent  
(Circle your answer)

2. In how many organizations in your local community do you hold formal or informal leadership roles?

Section IX - Work Environment

Sometimes people in organizations have difficulty planning and making decisions because of a lack of needed information or because things change unexpectedly. In these questions we ask you to evaluate how frequently these sorts of things occur in your County Extension Service.

1. How often are there changes in the social, economic, or political conditions in your county which directly affect County Extension work?

Rarely  Occasionally  Frequently
2. People can often point to prevailing ideas in their profession about the best methods or techniques to be used in their jobs. How often are there changes in such ideas regarding County Extension work?

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<tr>
<td>Rarely</td>
<td>Occasionally</td>
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3. How often do you believe that the information you have about your county is sufficient for decision making?

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<td>Rarely</td>
<td>Occasionally</td>
<td>Frequently</td>
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4. How often do you believe that the information you receive from area and state Extension staff is sufficient for decision-making?

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<td>Rarely</td>
<td>Occasionally</td>
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5. How often do you know what to expect in your dealings with other people or organizations in the county?

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<tr>
<td>Rarely</td>
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Section X - Feedback from the Area Office and County Clientele

The success of future Extension programs often depends on the information that County Extension staff receive about current programs. In this section we would like to learn more about the frequency and usefulness of feedback information that various individuals and groups provide to your county staff.

1. How frequently do

(a) You get together with your Area Extension Director to hear his or her evaluations and suggestions for improving County Extension programs? 1 2 3 4 5 6 7 8 9 10 11

(b) Other staff members in your County Extension Service get together with your Area Extension Director to hear his or her evaluations and suggestions for improving County Extension programs? 1 2 3 4 5 6 7 8 9 10 11

(c) You or other staff members in your County Extension Service get together with the Extension Council to hear their evaluations and suggestions for improving County Extension programs? 1 2 3 4 5 6 7 8 9 10 11
(d) You or other staff members in your County Extension Service get together with county clientele, including volunteer 4-H leaders, producer groups, homemaker groups, etc., to hear their evaluations and suggestions for improving County Extension programs?

To what extent:

2. Have evaluations and suggestions offered by the following led to changes and improvements in Extension programs conducted in your county?

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<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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<tbody>
<tr>
<td>(a) County clientele</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
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<tr>
<td>(b) County Extension council</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Area Extension director</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Area staff</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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3. To what extent can you depend on your

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<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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</thead>
<tbody>
<tr>
<td>(a) Area Extension Director to provide county staff with constructive comments and feedback on Extension activities in your county?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Extension Council to provide county staff with constructive comments and feedback on Extension activities in your county?</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
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</tbody>
</table>
This set of questions is concerned with your assessment of various aspects of County Extension Service programs and goals. You, perhaps more than anyone else, are the best judge of what sort of job your County Extension Service is doing.

Based on your county goals, to what extent:

1. Is the quantity (number) of programs provided to clientele groups consistent with your county goals?

   1 2 3 4 5 6 7 8 9 10 11
   Number falls short or exceeds expectations

2. Is the quality (how good) of programs provided to clientele groups consistent with your county goals?

   1 2 3 4 5 6 7 8 9 10 11
   Quality falls short or exceeds expectations

3. Is the distribution of programs to various clientele groups consistent with your county goals?

   1 2 3 4 5 6 7 8 9 10 11
   Distribution consistent with goals

4. Is your County Extension Service successful in meeting goals which are relevant to your county's specific needs?

   1 2 3 4 5 6 7 8 9 10 11
   To a very little extent To some extent To a very great extent

5. Does your County Extension Service obtain maximum output from programs provided to clientele groups?

   1 2 3 4 5 6 7 8 9 10 11
   To a very little extent To some extent To a very great extent

6. Is your County Extension Service successful in meeting the overall goals of the Iowa Cooperative Extension Service (e.g., goals identified at the area level which may or may not be relevant to your county's needs)?

   1 2 3 4 5 6 7 8 9 10 11
   To a very little extent To some extent To a very great extent
One general goal of Extension is to provide information and education through direct participation in Extension programs and activities. To what extent:

7. Are individuals and groups in your county receiving these direct benefits from County Extension Service programs?

1 2 3 4 5 6 7 8 9 10 11
To a very little extent To some extent To a very great extent

8. Are there some individuals and groups in your county that should be receiving direct benefits from Extension Service programs in your county but are not receiving direct benefits?

1 2 3 4 5 6 7 8 9 10 11
Very few Some clientele Many clientele

9. In all organizations, including Extension, some time must be devoted to activities which are not directly related to the organizational mission. These activities can be thought of as "routine maintenance"—like changing the oil in your car. To what extent is staff time in your county devoted to activities where county clientele are not directly involved or receiving benefits; i.e., staff training, filing reports, planning future programs?

1 2 3 4 5 6 7 8 9 10 11
Very little Sometimes A great deal of time

10. As was suggested in (9) above, organizations like Extension must sometimes use their resources inefficiently. Professional staff, for example, may be asked to conduct programs on topics for which they have had little previous training. To what extent is this true in your county?

1 2 3 4 5 6 7 8 9 10 11
To a very little extent To some extent To a very great extent

11. Given your special knowledge of the Extension Service in your county, how would you rate its overall performance?

1 2 3 4 5 6 7 8 9 10 11
Poor Mixed Fair Good Outstanding
COUNTY EXTENSION COUNCIL CHAIRMEN:

Their Opinions of Extension Field Operations and Impact

A 1977 Survey of Iowa County Extension Councils

BY
IOWA STATE UNIVERSITY
of Science and Technology

Ames, Iowa

Department of Sociology
Agriculture and Home Economics Experiment
Station No. 2271
Please Read Carefully Before Proceeding

1. Please answer all of the questions asked in the questionnaire, using the answer categories provided. This is the only way that we can insure that your views, as a representative of the county and the County Extension Council, will be recorded. If you wish to qualify your answers in any way, we invite you to do so in the margins, but only after using the answer spaces and categories provided.

2. It is anticipated that the questionnaire can be completed in about half an hour.

3. Because you are the County Extension Council chairman and elected by your community to serve on the council, we are very much interested in your opinions about the County Extension Service in your county.

4. Specific instructions are provided at the beginning of each new section. Please read these carefully. NOTE that some questions have several parts to them. Complete all parts of those questions.

5. When you have completed the entire questionnaire you will find that all you need do is:

A. Close the questionnaire booklet,

B. Staple the booklet in the places indicated on the back cover,

C. Mail (postage and addresses have already been provided).

IN ORDER TO AVOID THE HOLIDAY MAIL DELAYS COMMON AT THIS TIME OF YEAR, PLEASE RETURN THE COMPLETED QUESTIONNAIRE ON OR BEFORE
Section I - Community Commitment

Listed below are questions which focus on the County Extension Service's commitment to work in your county. We are interested in your opinions on the extent to which the County Extension Service staff has a desire to meet the needs of individuals and groups in the county. For each question, circle the number which best corresponds to your response.

To what extent:

1. Are the programs of your County Extension Service consistent with your perception of the needs of people in the county?

   1 2 3 4 5 6 7 8 9 10 11
   To a very little extent    To some extent    To a very great extent

2. Do Extension staff members in your county

   (a) Really want to meet the needs of people in the county?

   1 2 3 4 5 6 7 8 9 10 11
   (Circle your answer)

   (b) Have a strong desire to work in the county?

   1 2 3 4 5 6 7 8 9 10 11

   (c) Exert high levels of effort on behalf of people in the county beyond minimal job expectations?

   1 2 3 4 5 6 7 8 9 10 11

   (d) Exhibit a sense of pride in working for the Extension Service in the county?

   1 2 3 4 5 6 7 8 9 10 11

   (e) Exhibit a feeling that the county's problems are their problems?

   1 2 3 4 5 6 7 8 9 10 11

Section II - Community Involvement

The following set of questions is concerned with the relationship between County Extension staff and individuals and groups in your county. We want to know your feelings about the level of involvement of county residents in planning and implementing Extension programs and the Extension staff's involvement in community activities other than those sponsored by the County Extension Service.
To what extent:

1. Do people in your county

<table>
<thead>
<tr>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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</thead>
<tbody>
<tr>
<td>(a) Take an active part in planning Extension programs with Extension staff members?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Take an active part in carrying out Extension programs with Extension staff members?</td>
<td></td>
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</tr>
<tr>
<td>(c) Have a clear understanding regarding the mission of the County Extension Service?</td>
<td></td>
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</table>

(Circle your answer)

1 2 3 4 5 6 7 8 9 10 11

2. Do Extension staff members in your county participate in community affairs beyond those programs sponsored by the County Extension Service?

<table>
<thead>
<tr>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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Section III - Community Support for Extension

This section of questions is directed toward obtaining information on the level of support that the County Extension Service is receiving from the county and how the Extension Service compares with other community organizations that may provide similar programs.

To what extent:

1. Would you like to see people in your county have more control of the County Extension Service's

<table>
<thead>
<tr>
<th>To a very little extent</th>
<th>To some extent</th>
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<tr>
<td>(a) Programs?</td>
<td></td>
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<tr>
<td>(b) Budget?</td>
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<tr>
<td>(c) Selection of priority groups?</td>
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</table>

(Circle your answer)

1 2 3 4 5 6 7 8 9 10 11
To what extent:

2. Does your County Extension Service do a good job in

| (a) Planning programs to meet the needs of people in your county? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| (b) Providing programs which meet the needs of people in your county? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| (c) Responding quickly to program needs expressed by clientele? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

3. Is your County Extension Service staffed with competent personnel?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| To a very little extent | To some extent | To a very great extent |

4. In comparison to other tax-supported organizations in your county, is your County Extension Service worthy of the public support (tax monies) it receives to carry out its mission?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| To a very little extent | To some extent | To a very great extent |

5. Does your County Extension Service

| (a) Give prompt service to people in the county? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| (b) Really take care of the problems people have? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| (c) Give fair treatment to people in the county? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| (d) Avoid making mistakes? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| (e) Correct mistakes? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

6. Do you believe in the philosophy of the Extension Service in your county?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| To a very little extent | To some extent | To a very great extent |
7. Does your County Extension Service compare with other government agencies and business organizations (private enterprise) on the following items?

Decide which organization or set of organizations is better on each item and place an X in the appropriate cells. If you cannot decide which is better for a given item, place an X in the All the Same cell. For example, if you feel that business organizations are better at giving prompt service to people in the county, you would place an X in the cell which corresponds to business organizations for this item (see sample below).

<table>
<thead>
<tr>
<th>Sample: (a) Giving prompt service to people in the county</th>
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<tbody>
<tr>
<td>(a) Giving prompt service to people in the county</td>
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<tr>
<td>(b) Really taking care of the people who have problems</td>
</tr>
<tr>
<td>(c) Giving fair treatment to all groups in the county</td>
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<tr>
<td>(d) Avoiding mistakes</td>
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<tr>
<td>(e) Correcting mistakes</td>
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<tr>
<td>(f) Providing educational assistance to increase the efficiency of agricultural production.</td>
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<tr>
<td>(g) Designing and implementing educational programs to enhance the growth and development of youth.</td>
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<tr>
<td>(h) Providing educational assistance to local officials in designing and implementing community development projects.</td>
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<tr>
<td>(i) Providing educational assistance to enable individuals and groups to improve the quality of their home and family life.</td>
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<tr>
<th>Extension Service Better</th>
<th>Other Govt. Agencies Better</th>
<th>Business Organizations Better</th>
<th>All the Same</th>
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8. Given your special knowledge of the Extension Service in your county, how would you rate its overall performance?

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<th>Poor</th>
<th>Mixed</th>
<th>Fair</th>
<th>Good</th>
<th>Outstanding</th>
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Section IV - Extension's Impact on Community

In this section we want you to respond to questions which ask about the impact of Extension programs on individuals and groups in your county. We are interested in your perceptions of the level of success of Extension programs in really meeting the needs of county residents.

To what extent:

1. Are people in your county receiving direct benefits from Extension Service programs in the county?

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<th>To some extent</th>
<th>To a very great extent</th>
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2. Are there some people in your county that should be receiving direct benefits from Extension Service programs in the county but are not receiving direct benefits?

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<th>To some extent</th>
<th>To a very great extent</th>
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3. Are you satisfied with the impact that the County Extension Service is having on your county in terms of the following

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<th>To a very great extent</th>
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<tr>
<td>(a) Quantity (number) of educational programs provided to groups in your county?</td>
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   | (b) Quality (how good) of educational programs provided to groups in your county? |
   | 1 2 3 4 5 6 7 8 9 10 11 |

   | (c) Balanced distribution of educational programs to various groups in your county? |
   | 1 2 3 4 5 6 7 8 9 10 11 |
To what extent:

4. Is your County Extension Service having an impact on the following groups in your county?

| (a) Rural residents | 1 2 3 4 5 6 7 8 9 10 11 |
| (b) Urban residents | 1 2 3 4 5 6 7 8 9 10 11 |
| (c) Lower income (rural) | 1 2 3 4 5 6 7 8 9 10 11 |
| (d) Higher income (rural) | 1 2 3 4 5 6 7 8 9 10 11 |
| (e) Lower income (urban) | 1 2 3 4 5 6 7 8 9 10 11 |
| (f) Higher income (urban) | 1 2 3 4 5 6 7 8 9 10 11 |
| (g) Racial/ethnic minorities | 1 2 3 4 5 6 7 8 9 10 11 |
| (h) The young | 1 2 3 4 5 6 7 8 9 10 11 |
| (i) The middle-aged | 1 2 3 4 5 6 7 8 9 10 11 |
| (j) The elderly | 1 2 3 4 5 6 7 8 9 10 11 |
| (k) Large farmers | 1 2 3 4 5 6 7 8 9 10 11 |
| (l) Small farmers | 1 2 3 4 5 6 7 8 9 10 11 |

5. How would you rate the overall impact that the County Extension Service is having on your county?

1 2 3 4 5 6 7 8 9 10 11
Poor Fair Good Outstanding

Section V - The County Extension Council Chairman

This set of questions is designed to obtain information about the background characteristics of County Extension Council chairmen in Iowa and their level of participation and involvement in Extension and other community organizations. We want to know more about the people who have been elected by their community to represent them on the County Extension Council.

What is your:

1. Age? _______

2. Marital status?

( ) Single
( ) Married
( ) Divorced or separated
( ) Widowed
What is your:

3. Family size (number of people in household including self)? ________
4. Primary occupation? ________________________
5. Level of education? (Please circle the highest grade you completed in school)
   Elementary  1  2  3  4  5  6  7  8
   High school  9 10 11 12
   College     13 14 15 16 or more
6. Sex? ( ) Male ( ) Female
7. Place of residence? ( ) Farm ( ) Non-farm
8. Community's population? ________________________
9. How many years have you lived in the county? ________

To what extent:

10. Do you actively participate in the
    (a) Formulation of policy (e.g., establishment of goals and directives) for your County Extension Service?
        (Circle your answer)
        To a very little extent  To some extent  To a very great extent
        1  2  3  4  5  6  7  8  9  10  11
    (b) Making of major decisions (e.g., establishing new programs, budget allocations, and hiring staff) in your County Extension Service?
        1  2  3  4  5  6  7  8  9  10  11

11. In how many community organizations other than the County Extension Service do you
    (a) Serve or belong? ________
    (b) Participate actively? ________
    (c) Hold leadership roles? ________
    (d) Participate in the formulation of policy? ________
AREA EXTENSION DIRECTORS

Their Assessment of County Extension Field Operations

A 1978 Survey of Iowa Area Extension Offices

By
Iowa State University
of Science and Technology

Ames, Iowa

Department of Sociology
Agriculture and Home Economics Experiment
Station No. 2271
Introduction: In this survey, we are going to ask you to make some difficult evaluations. We are interested in learning how various counties located in your Area jurisdiction compare with each other. In many cases, certain counties will be very similar to each other and you will be asked to distinguish among them on very small differences. All we ask is that you try the best you can. Again, we would like to emphasize that these responses will be kept in the strictest confidence. You can be assured that nothing you say will ever be associated with you as a person nor will individual counties be allowed to see this information.

Section I: Programming in the Counties

This section of questions is intended to provide information about programming activities in various counties. We are also interested in your estimates of public support for Extension. Based on your special knowledge of county Extension units, please answer the following questions.

(1) To what extent do each of the following counties do a good job in providing programs which meet clientele needs?

<table>
<thead>
<tr>
<th>Counties located in Area jurisdiction listed here</th>
<th>To a very little extent</th>
<th>To some extent</th>
<th>Great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
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<td>1 2 3 4 5 6 7 8 9 10 11</td>
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<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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</tbody>
</table>
(2) In each of the following counties, to what extent is the number of educational programs provided to clientele groups consistent with county goals?

<table>
<thead>
<tr>
<th>Counties located in Area jurisdiction listed here</th>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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</table>

(3) In each of the following counties, to what extent is the quality of educational programs provided to clientele groups consistent with county goals?

<table>
<thead>
<tr>
<th>Counties located in Area jurisdiction listed here</th>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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</table>

(4) In each of the following counties, to what extent is the distribution of programs to various clientele groups consistent with county goals?

<table>
<thead>
<tr>
<th>Counties located in Area jurisdiction listed here</th>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
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<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
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</table>
(5) To what extent have each of the following county units been able to gain the respect and public support of county residents for county Extension programs?

<table>
<thead>
<tr>
<th>Counties located in Area jurisdiction listed here</th>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(6) To what extent do each of the following county units have a difficult time getting their annual budgets approved by their county Extension Councils?

<table>
<thead>
<tr>
<th>Counties located in Area jurisdiction listed here</th>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(7) To what extent are each of the following county offices desirable places to work (i.e., have a pleasant organizational climate, friendly co-workers, sufficient office space, etc.)?

<table>
<thead>
<tr>
<th>Counties located in Area jurisdiction listed here</th>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(8) Given your special knowledge of the Extension units in your area, please rate each of the following county units with respect to their overall performance:

<table>
<thead>
<tr>
<th>Poor</th>
<th>Mixed</th>
<th>Fair</th>
<th>Good</th>
<th>Outstanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Counties located in Area jurisdiction listed here

Section II: Area Support of County Programs

This section seeks to identify those counties which might benefit from greater input from the Area Office.

(1) To what extent should the area office have more input into program development in each of the following counties?

<table>
<thead>
<tr>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Circle your answer)</td>
<td>(Circle your answer)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Counties located in Area jurisdiction listed here</th>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
</tr>
</thead>
</table>
(2) To what extent should the area office have more input into the budgeting process in each of the following counties?

<table>
<thead>
<tr>
<th>Counties located in Area jurisdiction listed here</th>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(3) To what extent should the area office have more input into the selection of priority audiences in each of the following counties?

<table>
<thead>
<tr>
<th>Counties located in Area jurisdiction listed here</th>
<th>To a very little extent</th>
<th>To some extent</th>
<th>To a very great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B
Table B.1. Descriptive statistics for dissertation variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Kurtosis</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational environment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived environmental uncertainty</td>
<td>3.733</td>
<td>1.203</td>
<td>2.031</td>
<td>1.164*</td>
</tr>
<tr>
<td>Environmental instability</td>
<td>9.519</td>
<td>6.120</td>
<td>1.722</td>
<td>1.055</td>
</tr>
<tr>
<td><strong>Inputs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of skills</td>
<td>2.340</td>
<td>.112</td>
<td>-.683</td>
<td>.610*</td>
</tr>
<tr>
<td>Level of experience</td>
<td>11.115</td>
<td>6.033</td>
<td>.819</td>
<td>.822</td>
</tr>
<tr>
<td>Perceived resource support</td>
<td>7.887</td>
<td>1.486</td>
<td>-.827</td>
<td>-.253</td>
</tr>
<tr>
<td><strong>Throughputs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socialization</td>
<td>6.876</td>
<td>1.850</td>
<td>.053</td>
<td>-.234*</td>
</tr>
<tr>
<td>Communication</td>
<td>8.623</td>
<td>1.509</td>
<td>3.455</td>
<td>-1.316*</td>
</tr>
<tr>
<td>Commitment</td>
<td>9.428</td>
<td>1.011</td>
<td>1.673</td>
<td>-1.156</td>
</tr>
<tr>
<td><strong>System properties</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical suprasystem feedback</td>
<td>7.100</td>
<td>2.349</td>
<td>-.321</td>
<td>-.639*</td>
</tr>
<tr>
<td>Horizontal suprasystem feedback</td>
<td>7.704</td>
<td>1.551</td>
<td>1.058</td>
<td>-.929*</td>
</tr>
<tr>
<td>Negentropy</td>
<td>.474</td>
<td>.360</td>
<td>2.585</td>
<td>1.016*</td>
</tr>
<tr>
<td>Internal integration</td>
<td>8.572</td>
<td>1.285</td>
<td>4.471</td>
<td>-1.248*</td>
</tr>
<tr>
<td>Vertical external integration</td>
<td>8.529</td>
<td>1.017</td>
<td>1.330</td>
<td>-.865</td>
</tr>
<tr>
<td>Horizontal external integration</td>
<td>8.589</td>
<td>1.159</td>
<td>.789</td>
<td>-.884*</td>
</tr>
<tr>
<td><strong>System output effectiveness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical approval of output</td>
<td>7.648</td>
<td>1.623</td>
<td>-.192</td>
<td>-.152</td>
</tr>
<tr>
<td>Horizontal approval of output</td>
<td>9.270</td>
<td>1.286</td>
<td>4.293</td>
<td>-1.641*</td>
</tr>
<tr>
<td>Achievement of purpose</td>
<td>8.452</td>
<td>1.113</td>
<td>2.465</td>
<td>-1.160</td>
</tr>
<tr>
<td>Efficiency of the output process</td>
<td>5.717</td>
<td>1.709</td>
<td>-.529</td>
<td>-.007</td>
</tr>
</tbody>
</table>

*All statistics based on 90 cases.

*Significant at the 0.02 level.
Table B.2. Unstandardized partial regression coefficients and their standard errors used in the 16 regression analyses linking constructs and system output effectiveness

<table>
<thead>
<tr>
<th>System measures</th>
<th>Vertical suprasystem approval</th>
<th>b</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational environment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived environmental uncertainty</td>
<td></td>
<td>-.415</td>
<td>.239</td>
</tr>
<tr>
<td>Environmental Instability</td>
<td></td>
<td>.025</td>
<td>.026</td>
</tr>
<tr>
<td><strong>Inputs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of skills</td>
<td></td>
<td>1.166*</td>
<td>.471</td>
</tr>
<tr>
<td>Level of experience</td>
<td></td>
<td>.018</td>
<td>.033</td>
</tr>
<tr>
<td>Perceived resource support</td>
<td></td>
<td>-.044</td>
<td>.143</td>
</tr>
<tr>
<td><strong>Throughputs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socialization</td>
<td></td>
<td>-.052</td>
<td>.140</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td>-.217</td>
<td>.152</td>
</tr>
<tr>
<td>Commitment</td>
<td></td>
<td>.294</td>
<td>.225</td>
</tr>
<tr>
<td><strong>System properties</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical suprasystem feedback</td>
<td></td>
<td>.062</td>
<td>.099</td>
</tr>
<tr>
<td>Horizontal suprasystem feedback</td>
<td></td>
<td>.257</td>
<td>.147</td>
</tr>
<tr>
<td>Negentropy</td>
<td></td>
<td>.146</td>
<td>.598</td>
</tr>
<tr>
<td>Internal integration</td>
<td></td>
<td>-.150</td>
<td>.152</td>
</tr>
<tr>
<td>Vertical external integration</td>
<td></td>
<td>-.069</td>
<td>.197</td>
</tr>
<tr>
<td>Horizontal external integration</td>
<td></td>
<td>-.059</td>
<td>.248</td>
</tr>
</tbody>
</table>

*These values have been adjusted for measurement error using the errors-in-variables technique.

* Significant at the 0.05 level.
<table>
<thead>
<tr>
<th>Horizontal supersystem approval</th>
<th>Achievement of purpose</th>
<th>Efficiency of output process</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>S.E.</td>
<td>b</td>
</tr>
<tr>
<td>-.306</td>
<td>.227</td>
<td>-.457*</td>
</tr>
<tr>
<td>.012</td>
<td>.028</td>
<td>-.010</td>
</tr>
<tr>
<td>-.570</td>
<td>.418</td>
<td>.256</td>
</tr>
<tr>
<td>-.009</td>
<td>.024</td>
<td>-.025</td>
</tr>
<tr>
<td>-.012</td>
<td>.122</td>
<td>.192</td>
</tr>
<tr>
<td>.225</td>
<td>.144</td>
<td>.156</td>
</tr>
<tr>
<td>-.146*</td>
<td>.136</td>
<td>.179</td>
</tr>
<tr>
<td>.415</td>
<td>.186</td>
<td>.106</td>
</tr>
<tr>
<td>.012</td>
<td>.108</td>
<td>.089</td>
</tr>
<tr>
<td>.193</td>
<td>.130</td>
<td>.180</td>
</tr>
<tr>
<td>.462</td>
<td>.320</td>
<td>-.226</td>
</tr>
<tr>
<td>-.062</td>
<td>.150</td>
<td>.110</td>
</tr>
<tr>
<td>.213</td>
<td>.255</td>
<td>.116</td>
</tr>
<tr>
<td>-.034</td>
<td>.339</td>
<td>.381</td>
</tr>
</tbody>
</table>
Table B.3. Unstandardized partial regression coefficients and their standard errors used in the 16 regression analyses linking constructs and system output effectiveness

<table>
<thead>
<tr>
<th>Vertical suprasystem approval</th>
<th>b</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived environmental uncertainty</td>
<td>-.252</td>
<td>.142</td>
</tr>
<tr>
<td>Environmental instability</td>
<td>.019</td>
<td>.030</td>
</tr>
<tr>
<td>Inputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of skills</td>
<td>1.163 *</td>
<td>.512</td>
</tr>
<tr>
<td>Level of experience</td>
<td>.018</td>
<td>.029</td>
</tr>
<tr>
<td>Perceived resource support</td>
<td>-.036</td>
<td>.115</td>
</tr>
<tr>
<td>Throughputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socialization</td>
<td>-.033</td>
<td>.093</td>
</tr>
<tr>
<td>Communication</td>
<td>-.163</td>
<td>.120</td>
</tr>
<tr>
<td>Commitment</td>
<td>.217</td>
<td>.180</td>
</tr>
<tr>
<td>System properties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical suprasystem feedback</td>
<td>.049</td>
<td>.080</td>
</tr>
<tr>
<td>Horizontal suprasystem feedback</td>
<td>.202</td>
<td>.123</td>
</tr>
<tr>
<td>Negentropy</td>
<td>.127</td>
<td>.494</td>
</tr>
<tr>
<td>Internal integration</td>
<td>-.120</td>
<td>.144</td>
</tr>
<tr>
<td>Vertical external integration</td>
<td>-.058</td>
<td>.182</td>
</tr>
<tr>
<td>Horizontal external integration</td>
<td>-.034</td>
<td>.210</td>
</tr>
</tbody>
</table>

*aThese values have not been adjusted for measurement error.

*Significant at the 0.05 level.
<table>
<thead>
<tr>
<th>Horizontal suprasystem approval</th>
<th>Achievement of purpose</th>
<th>Efficiency of output process</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>S.E.</td>
<td>b</td>
</tr>
<tr>
<td>-0.186</td>
<td>0.113</td>
<td>-0.278*</td>
</tr>
<tr>
<td>0.009</td>
<td>0.022</td>
<td>0.006</td>
</tr>
<tr>
<td>-0.571</td>
<td>0.413</td>
<td>0.268</td>
</tr>
<tr>
<td>-0.009</td>
<td>0.023</td>
<td>-0.024*</td>
</tr>
<tr>
<td>-0.010</td>
<td>0.093</td>
<td>0.158</td>
</tr>
<tr>
<td>0.145*</td>
<td>0.071</td>
<td>0.101</td>
</tr>
<tr>
<td>-0.010*</td>
<td>0.091</td>
<td>0.149</td>
</tr>
<tr>
<td>0.326*</td>
<td>0.136</td>
<td>0.104</td>
</tr>
<tr>
<td>0.015</td>
<td>0.062</td>
<td>0.078*</td>
</tr>
<tr>
<td>0.152</td>
<td>0.094</td>
<td>0.154*</td>
</tr>
<tr>
<td>0.467</td>
<td>0.382</td>
<td>-0.229</td>
</tr>
<tr>
<td>-0.045</td>
<td>0.111</td>
<td>0.110</td>
</tr>
<tr>
<td>0.169</td>
<td>0.141</td>
<td>0.120*</td>
</tr>
<tr>
<td>0.009</td>
<td>0.163</td>
<td>0.362*</td>
</tr>
</tbody>
</table>
Table B.4. Intercorrelations among system output effectiveness measures

<table>
<thead>
<tr>
<th>System output effectiveness</th>
<th>Vertical suprasystem approval</th>
<th>Horizontal suprasystem approval</th>
<th>Achievement of purpose</th>
<th>Efficiency of output process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical suprasystem approval</td>
<td>--</td>
<td>.14*</td>
<td>.26***</td>
<td>.15*</td>
</tr>
<tr>
<td>Horizontal suprasystem approval</td>
<td>--</td>
<td>.16*</td>
<td>--</td>
<td>-.04</td>
</tr>
<tr>
<td>Achievement of purpose</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>.09</td>
</tr>
<tr>
<td>Efficiency of output process</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

*aUnadjusted for measurement errors.

*Significant at the 0.10 level.

**Significant at the 0.01 level.
Table B.5. Multiple correlation coefficients and zero-order correlations between the environmental construct measure, environmental concepts' measures, and measures of system output effectiveness

<table>
<thead>
<tr>
<th>Environmental measures</th>
<th>System output effectiveness measures</th>
<th>Vertical suprasystem approval</th>
<th>Horizontal suprasystem approval</th>
<th>Achievement of purpose</th>
<th>Efficiency of output process</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>r</td>
<td>R</td>
<td>r</td>
</tr>
<tr>
<td>Organizational environment</td>
<td></td>
<td>.13</td>
<td>.09</td>
<td>.26**</td>
<td>.04</td>
</tr>
<tr>
<td>Perceived environmental</td>
<td></td>
<td></td>
<td></td>
<td>- .18**</td>
<td>-.17*</td>
</tr>
<tr>
<td>uncertainty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental instability</td>
<td></td>
<td>.06</td>
<td>.03</td>
<td>.01</td>
<td>-.06</td>
</tr>
</tbody>
</table>

*a* Unadjusted for measurement error; multiple correlations adjusted for shrinkage.

*Significant at the 0.10 level.

**Significant at the 0.05 level.

***Significant at the 0.01 level.
Table B.6. Multiple correlation coefficients and zero-order correlations between the inputs construct measure, inputs concepts' measures, and measures of system output effectiveness^a

<table>
<thead>
<tr>
<th>Inputs measure</th>
<th>System output effectiveness measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vertical suprasystem approval</td>
</tr>
<tr>
<td>Inputs</td>
<td>R</td>
</tr>
<tr>
<td>Level of skills</td>
<td>.16</td>
</tr>
<tr>
<td>Level of experience</td>
<td>.04</td>
</tr>
<tr>
<td>Perceived resource support</td>
<td>-.01</td>
</tr>
</tbody>
</table>

^Unadjusted for measurement errors; multiple correlations adjusted for shrinkage.

^Adjusted value cannot account for any variation in system output effectiveness measure.

^Statistically significant at the 0.10 level but in opposite direction hypothesized.

* Significant at the 0.10 level.

** Significant at the 0.05 level.
Table B.7. Multiple correlation coefficients and zero-order correlations between the throughputs construct measure, throughputs concepts' measures, and measures of system output effectiveness

<table>
<thead>
<tr>
<th>Throughputs measures</th>
<th>System output effectiveness measures</th>
<th>Vertical suprasystem approval</th>
<th>Horizontal suprasystem approval</th>
<th>Achievement of purpose</th>
<th>Efficiency of output process</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Throughputs</td>
<td></td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
</tr>
<tr>
<td>Socialization</td>
<td>-.04</td>
<td>.21**</td>
<td>.17*</td>
<td>.16*</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>-.11</td>
<td>-.03</td>
<td>.23**</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>Commitment</td>
<td>.09</td>
<td>.23**</td>
<td>.16*</td>
<td>-.11</td>
<td></td>
</tr>
</tbody>
</table>

*aUnadjusted for measurement errors; multiple correlations adjusted for shrinkage.

*bAdjusted value cannot account for any variation in system output effectiveness.

*Significant at the 0.10 level.

**Significant at the 0.05 level.
Table B.8. Multiple correlation coefficients and zero-order correlations between the system properties construct measure, system properties concepts' measures, and measures of system output effectiveness

<table>
<thead>
<tr>
<th>System properties measures</th>
<th>System output effectiveness measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vertical suprasystem feedback</td>
</tr>
<tr>
<td></td>
<td>$R_r$</td>
</tr>
<tr>
<td>Vertical suprasystem feedback</td>
<td>$-0.04$</td>
</tr>
<tr>
<td>Horizontal suprasystem feedback</td>
<td>$0.16^{*}$</td>
</tr>
<tr>
<td>Negentropy</td>
<td>$0.01$</td>
</tr>
<tr>
<td>Internal integration</td>
<td>$-0.05$</td>
</tr>
<tr>
<td>Vertical external integration</td>
<td>$-0.02$</td>
</tr>
<tr>
<td>Horizontal external integration</td>
<td>$0.02$</td>
</tr>
</tbody>
</table>

Unadjusted for measurement errors; multiple correlations adjusted for shrinkage.

Adjusted value cannot account for any variation in system output effectiveness measure.

Statistically significant at the 0.01 level but in opposite direction hypothesized.

Significant at the 0.10 level.

Significant at the 0.05 level.

Significant at the 0.01 level.
Table B.9. Intercorrelations among all research variables

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Table B.10. Intercorrelations among all research variables

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