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UNDERSTANDING MANAGEMENT SUPPORT SYSTEM EFFECTIVENESS: AN ORGANIZATION THEORY PERSPECTIVE

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ABSTRACT

Management support systems' (MSSs) evaluation is a central component in information management. Evaluation methods currently in use were initially developed to assess the automation of clerical systems, and thus cannot deal effectively with MSS complexities. In order to identify, create, and choose appropriate methods, a theory of MSS effectiveness must be developed. As a first step in theory building, the meaning of MSS effectiveness is examined here.

This paper uses organization theory to better understand what MSS effectiveness is. As a result, effectiveness is defined contingent upon a four dimensional framework which reflects the evaluation context. The meaning of MSS effectiveness varies depending upon the placement within these dimensions, and the proper placement depends upon contextual complexity and turbulence and upon the desires of the evaluation client.

With this increased understanding of MSS effectiveness, the adequacy of existing evaluation methods is examined, guidance for creating new methods is offered, and a strategy for choosing among methods is introduced.

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1. INTRODUCTION

Management support systems (MSSs) are those management information systems, decision support systems, etc. which are designed for the specific and direct support of the managerial process in organizations. The need to evaluate the efficiency and effectiveness of these systems has been raised by many authors. As an integral part of the information management process, such evaluations are used for prioritizing system development proposals, for selecting among alternative systems, for post development audits, and for corporate-wide resource allocation (Ginzberg 1979, Hamilton and Chervany 1981a, Keen and Stabell 1980, King and Schrems 1978, Lincoln 1986). In addition, efficiency and effectiveness evaluations have been used to support political decisions and actions (Hirschheim and Smithson 1986, Franz and Robey 1984, King and Schrems 1978).

Though information system efficiency is relatively easy to determine (Kleijnen 1980, Emery 1974), few organizations have an adequate process for evaluating MSS effectiveness (Hamilton and Chervany 1981a), and researchers have provided little help (Chismar and Kriebel 1985, Ginzberg 1979). There are many reasons for this ineffectiveness and lack of research support. For example, it is very difficult to trace and measure the effects of information technology through a web of intermediate time-space impacts on enterprise level performance (Gremillion and Pyburn 1985, McFarlan 1984a, Crowston and Treacy 1986); the timing of payoffs is relatively unpredictable (how often will a decision arise in which the MSS plays a critical role? - Gremillion and Pyburn 1985); the more far reaching and innovative the technology introduced, the more difficult it is to provide a credible estimate of its benefits (Mohrman and Lawler 1984, Zwass 1985); and MSSs are dynamic with evolutionary

changes in objectives due to learning by users and data processing professionals (McFarlan 1984a, Hamilton and Chervany 1981).

Underlying these reasons for MSS effectiveness evaluation inadequacy is the lack of relevant theory (Swanson 1987, Hirschheim and Smithson 1986, Kleijnen 1980, Ahituv 1980). The purpose of this paper is to help create a cohesive theory of MSS effectiveness by better understanding the meaning of MSS effectiveness. This step is critical in theory development because of the wide variety of effectiveness definitions currently in use and because the problem of theory development becomes significantly easier when it is properly framed. Once developed, an MSS effectiveness theory can aid in:

- o determining whether existing evaluation methods are adequate,
- o guiding the creation of new methods,
- o helping evaluators choose the appropriate method.

The effectiveness of information systems in general is not of interest here. Rather the focus is upon MSSs and upon organizations. Thus, the following are assumed in subsequent discussions:

1. MSSs gain value in terms of their effect upon organizational effectiveness, through the direct support of management activities.
2. Managers are capable of proactively affecting the course of the organization as opposed to being ineffective or merely acting in a ritualistic role.

Issues such as the effects of information use upon non-managers, upon a manager's personal life, upon industries, and upon society are not addressed. This is not to say that these effects are not important (Ginzberg and Zmud 1986, Bakos 1987), but rather that they are not the subject of this paper. In addition, effects associated with information production (e.g., MIS department efficiency) are not addressed. These effects are also important, but their

evaluation is relatively straight forward (Kleijnen 1980, Emery 1974). These restrictions allow a fuller treatment of MSSs, though at the expense of greater generality.

2. PRIOR RESEARCH ON MSS EFFECTIVENESS

Interestingly, the lack of information system effectiveness theory has not deterred researchers from offering and implementing many evaluation methods (and techniques). With some exceptions (e.g., Keen and Scott Morton 1978, Ahituv 1980) these methods can be divided into two approaches.[1] The first focuses upon actions and perceptions of individual stakeholders. Here, methods offered include measuring MIS usage as an indicant of success (Srinivasan 1985, Maish 1979, King and Rodriguez 1978, Lucas 1975, Swanson 1974) and measuring perceptions of MIS characteristics (such as report accuracy and timeliness) via questionnaire as indicants of success (Cooper and Wolodzko 1988, Baroudi and Orlikowski 1988, Miller and Doyle 1987, Ives, Olson, and Baroudi 1983, Bailey and Pearson 1983). Employment of such questionnaires has been reported by Matlin (1979); Tait and Vessey (1988); Guimaraes and Gupta (1988); Baroudi, Olson, and Ives (1986); and Alloway and Quillard (1981).

The second approach is economic, where various methods are suggested to evaluate the impact of information production and use on organization costs and revenues (Cooper 1985, Chismar and Kriebel 1985, Stabell 1982, Gremillion and Pyburn 1985, Lincoln 1986, Kriebel and Raviv 1980, King and Schrems 1978, Crowston and Treacy 1986, Kleijnen 1980). For example, King and Schrems offer a cost-benefit analysis method which attempts to measure the financial impact of information systems. Implementation of these methods has resulted in the

examination of information systems' impact on organizational costs (Cooper 1987, Bender 1986, Kriebel and Raviv 1982, Stabell and Forsund 1982) on firm profitability (Cron and Sobol 1983), and on revenues (Fudge and Lodish 1977).

Given the many evaluation methods available, the following questions arise:

- o Are the methods currently available adequate?
- o What guidance there is for new method development?
- o How can the best (or more appropriate) method be chosen?

Answers to these questions require a theory of MSS effectiveness, which currently does not exist. There are some frameworks addressing these issues (e.g., Hamilton and Chervany 1981, Ginzberg and Zmud 1986). However, these frameworks are not based in a coherent research literature and, though intuitively reasonable, have little theoretical justification for their insights.

This tenuous link with theory leads to concerns about model misspecification and validity. For example, Hamilton and Chervany (1981) suggest that information system evaluation methods can be described on a single efficiency - effectiveness dimension, and though efficiency methods are easier to implement, effectiveness methods are generally more appropriate. In contrast, Ginzberg and Zmud (1986) describe three evaluation methods dimensions (1. technical, operational, or economic focus; 2. past, present, or future time frame; 3. summative or formative nature) and three evaluation context dimensions (1. stakeholders; 2. organizational role of the information system; 3. purpose of the evaluation), and then make contingent recommendations concerning which evaluation method characteristics are more appropriate for evaluation contexts.

Is the Hamilton and Chervany model underspecified? Is the Ginzberg and Zmud model overspecified? Is the universal claim correct that effectiveness methods are generally more appropriate (Hamilton and Chervany)? Or should the choice be contingent upon the evaluation context (Ginzberg and Zmud)? There is currently no substantive theory from which to answer these questions.

In response to the need for such answers, and for answers to the three previously posed questions concerning the development and choice of appropriate evaluation methods, this paper takes a step toward developing an MSS effectiveness theory. The focus is upon gaining a better understanding of what MSS effectiveness is. This is an appropriate beginning, since the definition of a problem leads naturally to its solution, and since many different definitions of MSS effectiveness exist (Ahituv 1980, Chismar and Kriebel 1985, Kling 1980).

Swanson (1987), Hamilton and Chervany (1981), and Ives, Olson, and Baroudi (1983), suggest that the effectiveness of any MSS must be measured in terms of what it accomplishes in the organization. In accord with this view, organizational theory[2] is chosen here as a foundation for analysis. MSSs are productive, then, to the extent that they help managers attain organizational effectiveness. Unfortunately, there are no definitive theories of organizational effectiveness; in fact, there is little agreement on a definition for organizational effectiveness (Chismar and Kriebel 1985, Goodman and Pennings 1977). This is because effectiveness is not a concept waiting to be discovered; rather, it is a high level abstraction with very subjective meanings (Quinn and Rohrbaugh 1983).

There is some agreement among organizational theorists that human behavior is goal directed (even if the goals cannot be clearly articulated - Campbell 1977), and thus effectiveness can be defined as the degree of congruence between goals and outcomes (Scott 1985, Hannan and Freeman 1977). However, this definition is less helpful than it first appears, since goals of an organization are associated with multiple constituencies and are often multidimensional, conflicting, unobserved, and temporally indeterminate (Campbell 1977, Scott 1985, Cameron 1986). Some authors suggest that though there are many conflicting goals, an organization only attends to a subset which are determined by negotiations and side payments within its dominant coalition (Pennings and Goodman 1977). However the stability of such goals is inhibited due to the dynamic nature of the negotiation process as well as the instability of the dominant coalition, especially in more complex and turbulent environments (Scott 1985).

Since MSS effectiveness is defined in terms of organization goal attainment, it is thus clear that a major problem with defining MSS effectiveness is the difficulty associated with defining organizational goals. Based upon Scott's (1985) extensive review of the organization effectiveness literature, it is proposed here that definitions of organization goals and resulting organization and MSS effectiveness depend upon the following evaluation contingencies: organization perspective, level of aggregation, time orientation, and domain of analysis. Thus, each of the 48 cells in Figure 1 represents a different definition of MSS effectiveness and potentially different MSS evaluation criteria and methods. Each of these contingencies is addressed below in relation to organizational goals and resulting MSS effectiveness.

3. ORGANIZATION PERSPECTIVE

There are many different internal and external stakeholders who may be interested in the evaluation of an MSS; they may emphasize one or more organization goals such as short term profit, long term profit, organization viability, effect upon political power, welfare of workers, welfare of society, conformance with governmental laws and regulations, etc. To give some order to the multitude of goal possibilities, many frameworks are available (e.g., Pfeffer 1982, Astley and Van de Ven 1983, Scott 1985). A slight variation on a framework by Scott (1985) is employed here; Quinn and Rohrbaugh (1983) have shown that this reflects the current thinking of organization theorists on organization goals.

The variation on Scott's framework consists of two dimensions - open versus closed and planned versus organic - which serve to classify various organization theories. The open versus closed dimension refers to the interaction of an organization with its environment:

- Open - An open perspective focuses primarily upon the effect of the environment on the organization. The environment is typically treated as a source of uncertainty, resources and opportunity, and is potentially open to manipulation.

- Closed - A closed perspective focuses primarily upon the internal workings of the organization. The environment is typically ignored or treated as containing simplified constraints upon the organization's behavior.

The planned versus organic dimension refers to whether organizations are viewed as deterministic instruments intentionally created and used for specific goal attainment or viewed as non-cohesive stochastic entities:

- Planned - A planned perspective postulates that an organization's behavior is intentional, and that the behavior is planned in an attempt to optimize (or at least satisfice) stated goals.

- Organic - An organic perspective postulates that an organization acts unintentionally (e.g., seems to react to its environment in an

unreasoning manner), its behavior has a large random component, and the pursuit of stated goals is problematic.

Note that this distinction is based here upon process rather than product (Scott 1985). Thus an organization can have "irrational" goals yet be considered planned due to the processes involved in attempting to attain those goals (e.g., World War II Germany). When the two dimensions are put together as in Figure 2a, four organizational perspectives associated with the four quadrants are created.

3.1. Closed Planned

An organization acts as a cohesive unit in an intentional, optimizing or satisficing manner. The environment is largely ignored, with theoretical interest focused inward upon the organization. It is assumed that goals are known, tasks are repetitive, output of the production process somehow disappears, and resources in uniform qualities are available. There is one best way of organizing, where specialization, departmentalization, and control are key and are determined based upon some overall strategy; the creation of this strategy by policy makers is outside the model. The influence of human characteristics is reduced by focusing upon the office (rules, salary, career) rather than the individual's behavioral characteristics (Scott 1985, Pfeffer 1982). Some organizational theories within this perspective include: Bureaucratic Theory (Weber 1947), Administrative Theory (Fayol 1949), and Decision Making (Simon 1957); see Appendix for details on these theories.

3.2. Closed Organic

This perspective is sometimes called natural systems. Due to multiple conflicting and changing goals of individuals and coalitions within an organization, when viewed as a whole, the organization seems to act in a non-

cohesive or unintentional or non-optimizing manner. The environment is largely ignored, with theoretical interest focused inward upon the organization. An organization's informal behavioral structure (interpersonal systems of power, status, communication, and friendship) rather than the formal structure (rules, roles, procedures) is emphasized. Participants have multiple interests and motives, and their individual characteristics make the organization complex. Rather than the organization being used as a means to achieve some end, the organization becomes an end in itself. This survival orientation may lead to neglect or distortion of the organization's stated goals or lead to the existence of the organization after such goals have been successfully attained (Scott 1985, Pfeffer 1982). Some organization theories within this perspective include: Choice Under Ambiguity (March and Olsen 1976) and Human Relations (Mayo 1945, Dalton 1959); see Appendix for detailed explanations.

3.3. Open Planned

The organization affects or reacts to its environment as a cohesive unit in an intentional optimizing or satisficing manner. Organizations exist because they are more efficient than the market system alone. Managers and organizational designers create formal organization structures - with varying degrees of formalization, differentiation, centralization, specialization, etc. - which effectively deal with contextual complexities such as organizational size, firm strategy, technology, environmental uncertainty, supplier power, and competition (Scott 1985, Pfeffer 1982). Some organization theories within this perspective include: Structural Contingency Theory (Lawrence and Lorsch 1967, Udy 1959, Blau 1970, Galbraith 1973, Thompson 1967), Market Failures or Transactions Cost (Williamson 1975, Ouchi 1980), and Resource Dependence (Pfeffer and Salancik 1978); see Appendix for details.

3.4. Open Organic

When viewed as a whole, the organization seems to act in a non-cohesive or unintentional or non-optimizing manner. The environment plays a significant role, impacting the organization's behavior (e.g., influencing organizational structure or survival), and is perceived as the source of materials, energy, and information which are vital to the organization's continuation. Organizational survival and elaboration is placed over stated "production" goal attainment. This orientation may lead to neglect or distortion of the organization's explicit goals or lead to the existence of the organization after such goals have been successfully attained. Survival and elaboration are difficult because the environment is complex and politicized; it may be more important to conform to externally imposed rules than to produce outputs efficiently. Power processes within the organization are complex and affected by the environment, potentially involving alliances with outsiders. Given overall limits to organization action, the environment may play a selection role in organization survival (Scott 1985, Pfeffer 1982). Some organizational theories within this perspective include: Strategic Contingency (Hickson et al. 1971, Pfeffer 1978), Population Ecology (Hannan and Freeman 1977b, Adlrich 1979), and Institutionalist Theory (Meyer and Rowen 1977, DiMaggio and Powell 1983); see Appendix for details.

3.5 Organizational Goals and Resulting MSS Effectiveness

This four quadrant framework describes alternative organization goal perspectives which can be adopted by MSS evaluators. Organization goals differ depending upon whether the organization is viewed as closed or open to its environment and whether it is viewed as acting in a planned or organic manner. Since MSS effectiveness is defined in terms of helping managers

attain these goals, the different organizational perspectives result in different perspectives on MSS effectiveness. This is demonstrated below, where the effect of different organizational goals upon evaluating the effectiveness of a material requirements planning (MRP)[3] MSS is examined:

1. Closed Planned - Organizations are instruments specifically created for the attainment of certain - typically economic - goals. Though the environment is largely ignored, it may be captured by simplistic (usually deterministic) resource cost and product demand characterizations which enable optimization goals such as cost minimization, revenue maximization, and profit maximization, as well as non-monetary goals associated with production volume and quality.

   MRP effectiveness evaluation example: Has the system reduced costs? Has it helped management schedule production more efficiently so that inventory holding costs have been reduced?

2. Closed Organic - System maintenance goals dominate output goals due to the overriding concern with survival. With its internal focus, important goals include the provision of an adequate context (inducements to participants, managerial interpersonal skills, etc.) in order to evoke contributions from employees which are adequate to ensure survival of both coalitions and the organization. Criteria for measuring goal attainment are typically more humanistic, focusing upon the fulfillment of human needs. Examples include employee satisfaction and morale as well as stability of the task context and power structure.

   MRP effectiveness evaluation example: Has the system affected the coalition power structure? Has the formal structure imposed by the system resulted in alienating production floor supervisors from production management, thereby reducing production management's power?

3. Open Planned - Organizations are instruments specifically created for the attainment of certain production goals. These goals are furthered by the organization's adaptation to or exploitation of its environment. The environment is assumed to be complex and organizational goals include increasing the organization's environmental power in relation to competition, suppliers, etc. as well as increasing its ability to cope with uncertainty via increased flexibility or adaptability.

   MRP effectiveness evaluation example: Has the system affected the power balance of the organization with its environment? If this system has been linked to suppliers, has it increased management's awareness of supplier differences and resulted in greater control over suppliers (increased power) or has it reduced management discretion resulting in greater dependence upon a few suppliers (decreased power)?

4. Open Organic - The primary goal of the organization is survival and growth. Organizations are comprised of relatively unstable coalitions which reflect the various changing and conflicting goals of their

participants. This internal instability is compounded by the turbulence of the environment and the fact that the organization is highly dependent upon the environment to survive. Criteria relating to survival include adaptability, flexibility, and conformance with social expectations.

MRP effectiveness evaluation example: Is this system in accord with social expectations concerning proper management? Independent of whether the system is used, does its implementation project the image of rational progressive management?

None of these four perspectives is the "right" perspective. They all may have descriptive validity in any organization. Each focuses upon different elements and interactions, thus examining MSS effectiveness in a different light. However, these perspectives are limited above to the organization as an aggregate. MSS effectiveness can also be viewed from different aggregation levels within the organization. For example, the impact of an MSS upon an individual manager's goal attainment will probably be different than the impact of the MSS upon an organization's goal attainment. Since effectiveness is defined in terms of goal attainment, MSS effectiveness is then affected by the level of aggregation.

4. LEVEL OF AGGREGATION

The level of aggregation - individual, group, division, firm - is an important evaluation consideration (Cameron and Whetten 1983, Ahituv 1980, Ginzberg and Zmud 1986, Chismar and Kriebel 1985, Bariff and Ginzberg 1980, Pennings 1984). For example, the impact of an MSS upon the effectiveness of a work group is not a simple average of the change in productivities of members of the group. Rather, the resulting work group effectiveness is a complex function of the individual productivities due to interactions and dependencies in the work process (Mahoney 1984). In general, when shifting from one level of aggregation to another, the definitions of exogenous versus endogenous and

dependent versus independent variables undergo significant changes (Thomas and Brief 1984, Weiss 1984, Pfeffer 1982). Thus goals and associated effectiveness definitions - which are sensitive to such variable definitions - undergo significant changes.

For the purpose of discussion, two aggregation levels are addressed: organization and individual. The organization level, its impact upon goals and MSS effectiveness, was described above using a variation on Scott's two dimension framework. Depending upon the perspective of individual behavior, goals can include utility maximization, power accumulation, group conformity, needs satisfaction, etc. Thus the same reasons for using the framework at the organization level exist at the individual level, and it is employed below in order to categorize individual perspectives and associated goals (Figure 2b). Note that with this shift from the organization to individual level, the definition of environment (or context) also shifts from competition, supplier, customer, government, etc. to supervisor, work group, organization structure, etc.

4.1 Closed Planned

The individual acts in an intentional, optimizing or satisficing manner. The environment is largely ignored, with theoretical interest focused inward upon the individual. An individual's behavior is the result of his cognitive process which attempts to maximize his personal value or utility. Action is thus taken which is consistent with his attitudes, beliefs, or value judgments, or which is based upon the attainment of his valued needs, goals, or preferences (Pfeffer 1982). People can be motivate by rewarding desired behavior - such as through increased wages - and by proper job structuring

which satisfies the individuals' higher order needs. Some organization theories within this perspective include: Instrumentality Theories (Vroom 1964, Fishbein 1967, Dulany 1968) and Needs Theories (Maslow 1954, Alderfer 1972, Salancik and Pfeffer 1977); see Appendix for details.

4.2 Closed Organic

The individual seems to act in an unintentional or non-optimizing manner. The environment is largely ignored, with theoretical interest focused inward upon the individual. The preeminence of cognition in individual behavior is denied. Rather than being governed by rule-based information processing, individuals' behaviors are motivated by habit or emotion. For example, it has been proposed that the emotional affect produced by interpersonal similarity is an important factor in the formation of groups, as well as in hiring and promotion decisions (Byrne 1969, Pfeffer 1982). Some organization theories within this perspective include: Non-Cognitive Theories (Abelson 1976, Langer 1978) and Affective Theories (Collins 1981, Pfeffer 1982); see Appendix for details.

4.3 Open Planned

The individual acts in an intentional, optimizing or satisficing manner in reaction to or to take advantage of his environment. For example, when confronted with group norms that conflict with previously held attitudes and beliefs, individuals may change their attitudes and beliefs in order to conform with the group so that rewards, such as acceptance by the group, can be obtained. Individuals may also manipulate their environment in order to increase their personal influence and power. Such power can be based upon the ability to provide inducements and punishment, upon authority associated with

an organizational role, upon relative expertise, etc. Some organization theories within this perspective include: Structural Effects (Blau 1960, Davis, Spaeth, and Huson 1961)and Political Theories (Pfeffer 1981, Pettigrew 1972, French and Raven 1959); see Appendix for details.

4.4 Open Organic

The individual seems to react to his environment in an unintentional manner. Manipulation or control of the individual by the environment leads to behavior which is not necessarily optimal from the individual's viewpoint. Cognitive aspects of individual behavior are ignored; unthinking responses to external stimuli are postulated. In addition, individual behavior may be fully specified by role demands, independent of individual characteristics. Some organization theories within this perspective include: Operant Conditioning (Nord 1969, Luthans and Kreitner 1975) and Role Theory (Kahn et al. 1964); see Appendix for details.

4.5 Individual Goals and Resulting MSS Effectiveness

As with the organizational level, individual goals differ depending upon whether the individual is viewed as closed or open to his environment and whether he is viewed as acting in a planned or organic manner. Since MSS effectiveness can be defined in terms of helping individual managers attain their goals, these different perspectives result in different perspectives on MSS effectiveness. This is demonstrated below, where individual goals associated with each perspective are summarized, and their effect upon evaluating the effectiveness of a MRP MSS is examined.

1. Closed Planned - An individual's behavior is intentional, resulting from a cognitive evaluation process. Goals of this process include behaving in a manner which is consistent with the individual's attitudes and beliefs and which maximizes the individual's attainment of rational needs or utility.

MRP effectiveness evaluation example: Has the system affected the manager's utility associated with his job? Has it resulted in deskilling with an attendent decrease in salary?

2. Closed Organic - Individuals are motivated by habit or emotion. From the habit perspective, goals of individual behavior can include a reduction of the amount of attention required for an activity (Langer 1978). From the emotion perspective, goals can include the increasing of positive affect; that is, behaving in a hedonistic manner that "feels good" without attempting a cognitive evaluation of the impact of that behavior upon rational needs and utility.

   MRP effectiveness evaluation example: Has the system affected the manager's pleasure associated with his decision making process independent of its impact upon his ability to make good decisions?

3. Open Planned - An individual's behavior is an intentional manipulation of or reaction to his environment, resulting from a cognitive evaluation process. Typical goals associated with this perspective include the expansion and maintenance of interpersonal influence or power and the determination of an optimal level of group conformance.

   MRP effectiveness evaluation example: Has the system affected the power balance of the manager with his environment? Has the system increased his power by increasing his authority (legitimate power) or by increasing his relative expertise (expert power)?

4. Open Organic - The individual's internal (cognitive or affective) processes are ignored. The individual's behavior is seen as totally subject to environmental manipulation independent of his beliefs and attitudes. "Individual goals" are thus not meaningful in this context.

As with the organizational level of aggregation, none of the four perspectives is the "right" perspective. They all may have descriptive validity for any individual, each focusing upon different elements and interactions, and thus examining the impact of an MSS in a different light.

In addition to organization perspective and level of aggregation, organization theory indicates that effectiveness definitions are dependent upon the time orientation.

5. TIME ORIENTATION

An effectiveness evaluation's time orientation (short term, static versus long term, dynamic) is important for the definition of effectiveness (Cameron and Whetten 1983, Scott 1977, Klein 1977, Thomas and Brief 1984, Hage 1984). Strategies for achieving static and dynamic effectiveness can be at odds with each other. For example, specialists may outperform generalists in the short run, but they may not last in the long run (Scott 1985). In addition, the meaning organizational effectiveness is very different at different stages of the organization's lifecycle (Seashore 1962, Cameron and Whetten 1981).

In the short term, a static view of the entity (individual or organization) and its environment is adopted, resulting in a severe limitation of the entity's options: technology, parameters, boundaries are fixed. From this view, effectiveness may be more associated with goals of productivity or profit maximization given production and cost functions. (Much of operations research, microeconomics, organizational behavior, and industrial engineering have this static focus - Thomas and Brief 1984).

In the long term, the view is dynamic, allowing significant changes to the entity and its environment; an entity's options are significantly expanded. With dynamic effectiveness, emphasis shifts to improvements over time; these improvements usually imply a changing entity through new technologies and new and different combinations of inputs not previously apparent in static relations. From this view, effectiveness is more associated with goals of adaptability and survivability. Such dynamic behavior has been captured in some microeconomic production functions by representing efficiency change as a shift in the production function; in

addition, this behavior is handled by industrial engineering and managerial theory through the use of progress functions which include the results from growing knowledge and experience (Thomas and Brief 1984).

In terms of MSS effectiveness, the long term dynamic view would ask how flexible and adaptable the system is to changes in the entity and its environment; in addition, this view would ask whether the system aids in making the entity more flexible and adaptable, or perhaps reduces the need for the entity to be flexible and adaptable. Assuming that the previous MRP examples maintained a short term static focus, examples of a long term dynamic focus might add the following:

Organization Level of Aggregation:

1. Closed Planned - This perspective assumes that there is one best way to organize and manage, independent of any changes. The long term dynamic view is thus the same as the short term static view.
2. Closed Organic - Has the system added to or detracted from the long term stability of existing power structures? Will newer implementations of the software automate more of production management's activities, thereby reducing their organizational power?
3. Open Planned - If linked to specific suppliers, is the system adaptable enough to allow linkage to other suppliers? Can the system help identify when suppliers ought to be changed?
4. Open Organic - Does the system allow for relatively easy changing or scrapping when social expectations concerning proper management change, or is it too tightly integrated into the organizational structure?

Individual Level of Aggregation:

1. Closed Planned - Does the system aid the manager to grow more proficient over time (e.g., through feedback on his decisions) and thus help him satisfy higher order needs? Can the system help change a managers' decision behavior as required (or act as a buffer to reduce the change necessary) due to changes in products, technology, etc.?
2. Closed Organic - Will the system still be fun to use over time? Or will a manager's enjoyment from using the system deteriorate in the long run?
3. Open Planned - How transient is the change in the manager's power which is due to the system? Can the system be made to inhibit its use and learning by others so that the manager's power due to expertise with the system is not diminished over time?
4. Open Organic -Not Applicable

In addition to this time orientation and the previously described organization perspective and level of aggregation, the definition of MSS effectiveness also depends upon the domain of analysis.

6. DOMAIN OF ANALYSIS

As demonstrated by Quinn and Rohrbaugh (1983), the definition of organizational effectiveness (and thus MSS effectiveness) changes depending upon the domain of analysis. The domain of analysis refers to whether effectiveness is examined in terms of entity (individual or organization) outcomes, processes, or input structure (Scott 1977, Hamilton and Chervany 1981a). This three-part formulation is an extension of means versus ends, where input structure and processes are the means by which outcomes are produced. An assumption of this paper is that MSSs are part of an entity's input structure; an entity's processes thus use an MSS in order to produce outcomes. Thus, as discussed later, ideally MSS effectiveness should be evaluated in terms of its impact upon outcome effectiveness. However, there are many circumstances when this cannot be done, and a less satisfying approach which evaluates an MSS in terms of its impact upon an entity's process or input structure must be used.

6.1 Outcome Effectiveness

Outcome effectiveness is determined by an entity's attainment of output goals. For example, output goals might consider sales of automobiles by an automobile dealer, health of patients by a hospital, and knowledge of students by a university. More generally, all of the goals offered in prior discussions were outcome-oriented given the organization perspective and the

level of aggregation. At the organizational level, profit maximization, employee morale enhancement, inter-organizational power enhancement, and organizational survival were cited as desirable outcomes from the various perspectives. At the individual level, rational utility maximization, pleasure enhancement, and individual power enhancement were cited as desirable outcomes from the various perspectives. The effect of an MSS upon these outcomes is posited to accrue via the MSS's impact upon the organizational and individual processes. The most desirable measure of MSS effectiveness is in terms of its ultimate impact upon outcomes. However, there are circumstances when this is not possible, and an MSS's impact upon the processes must be used instead.

6.2 Process Effectiveness

Process effectiveness is determined by assessing quantity and quality of the process rather than outcomes, assessing effort rather than effect, assessing means rather than ends. As such, there are strong assumptions linking processes to outcomes. For example, it is normally assumed that better management decisions will lead to increased organization profit. However, assumptions linking process to outcomes are typically tenuous, and there is thus a danger with the focus upon processes to the exclusion of outcomes. It should be noted, however, that there are cases when processes may actually be outcomes. For example, ceremony can be considered the substance or outcome of religious and possibly legal organizations (Scott 1985).

The focus of this paper is upon the effect of an MSS on an entity via its direct impact upon management. When assessing MSS process effectiveness, the

processes of immediate interest are those of management, rather than, for example, the production floor. One view of management is that managers plan, organize, staff, direct, and control in order to achieve organization level outcome goals such as profit or survival (Koontz and O'Donnell 1974) as well as individual level goals such as utility or needs maximization. Decision making and communicating are common elements for all of these activities, and can be focused on as primary management processes. For discussion purposes, the effect of an MSS upon the attainment of decision making goals is examined below.

An assumption of this paper is that managers use MSSs proactively in order to attain an entity's goals. At the organizational level of aggregation, the managerial decision making process can be actively involved with maximizing organizational profit (closed planned), or increasing employee morale (closed organic), or increasing inter-organizational power (open planned), or organizational survival (open organic), depending upon the perspective taken. There are thus global goals associated with the managerial decision making process at this level of aggregation, which are independent of the perspective. These goals include becoming more effective in all decision making phases (intelligence, design, choice) by, for example, decreasing response time (decreasing time taken to identify a problem or opportunity, to create alternative actions, and to decide upon an action) and increasing accuracy (decreasing systematic and random error). Thus, MRP system effectiveness from the organization level of aggregation might be evaluated in terms of:

1. Closed Planned - Has the system increased the ability of management to identify potential scheduling conflicts? Has it reduced the time required to identify these conflicts?

2. Closed Organic - Has the system, and its formality, distanced the managers from their employees and reduced humanistic (morale) considerations in the scheduling process?
3. Open Planned - Has the system increased the ability and/or reduced the time required to identify high quality, low price suppliers?
4. Open Organic - Does the system help enforce "rational" decision making processes as defined appropriate by society?

At the individual level of aggregation, goals of the managerial decision making process are not independent of the perspective. Rather, they depend upon whether the perspective is planned or organic. Within the closed and open planned perspectives, decision making is a cognitive process which determines behavior that maximizes the individual manager's needs, utility, or power. Thus decision making process goals at an individual level within these planned perspectives are the same as those effectiveness goals described above for the organization level of aggregation. However, the MRP system example cannot be extended to this level. For a system to be effective at this level, it would have to help individuals with their personal utility calculations determining, for example, an appropriate career path. An MRP system will not facilitate this type of decision making process.

Within the closed and open organic perspectives, individual level decision making is either ignored or associated with gains in positive affect. Thus a potential goal of a manager's decision making process from these perspectives is gaining pleasure from the process itself, and an MRP system can be evaluated in this light.

6.3 Input Structure Effectiveness

Input structure effectiveness is determined by assessing the capacity or ability of an entity to be productive. Examples of input structure include

the age and value of machine tools in a manufacturing firm; the adequacy of facilities, equipment, and staff in a hospital; and the types of degrees held by faculty in a university (Scott 1985). The tenuous link between process effectiveness and outcome effectiveness described earlier is further exacerbated when input structure effectiveness is assessed: the capacity to perform "well" is assumed to lead to productive processes which are assumed to lead to productive outcomes. Problems with this assumption chain have been illustrated with, for example, personnel licensing requirements which have led to non-optimal employee usage (Tancredi and Woods 1972).

Focusing upon the management process, an MSS is part of an input structure used by management decision making and communicating. Examining decision making, the MSS input structure goal is to provide appropriate information and tools. Information appropriateness can be defined in terms of information characteristics such as content, age, detail, scope, accuracy, precision, response time, volume, etc. (Cooper 1983, Hamilton and Chervany 1981). Tool appropriateness can be defined in terms of validity, flexibility, ease of use, etc. (Hamilton and Chervany 1981), and the ability to observe, select, match, sort, calculate, compare, etc. (Mason 1978).

The definition of MSS input structure goals are based upon actual or assumed relationships between attainment of these goals and attainment of associated process and outcome goals. For example, it is commonly assumed that increased information accuracy leads to better decisions. Thus, an MRP system can be evaluated in terms of input structure as to whether it has increased the accuracy of information on costs, routings, etc. (Hamilton and Chervany 1981). In addition to examining information characteristics alone,

much research has identified input structure goals in terms of a proper fit of information characteristics with the entity. For example, the information content should monitor factors critical to the success of the entity (Rockart 1979, Boynton and Zmud 1984), should match the information systems maturity (stage of growth) of the entity (Nolan 1982), and the information presentation characteristics should match the information processing capability/style of the entity (Dickson, Senn, and Chervany 1977). There is also research into information tool appropriateness. For example, work on individual and group decision support systems supports the notion that successful systems are those which are adaptable, flexible, and have a simplified human-machine interface (Cooper 1988).

Unfortunately, research into impacts of these information and tool characteristics upon management decision making has led to conflicting and confusing results (Cooper 1988). Thus, though it is believed that MSS input structure goals should be defined in terms of these characteristics, their nature is not known.

7. DISCUSSION

MSSs are productive to the extent that they support management in attaining organization goals. Unfortunately, this does not lead to a global notion of effectiveness. Rather, the definition (and thus determination) of MSS effectiveness varies dramatically depending upon the positioning on each of four dimensions:

- o organization perspective (planned - organic, closed - open),
- o level of aggregation (individual - organization),
- o time orientation (static, short term - dynamic, long term),
- o domain of analysis (input structure - process - outcome).

Which definition is (more) appropriate has been the subject of much conjecture. Each definition views the organization and associated MSS impacts in a different light, and can add to the understanding of MSS effectiveness within an organization. However, all may not add equally to this understanding. There may be circumstances when one definition can help explain and predict a larger share of an MSS's impact on an organization than other definitions. The organization literature suggests that organization and environmental complexity and turbulence as well as the evaluation purpose affects the appropriateness of alternative MSS effectiveness definitions associated with each dimension.

7.1 Organization Perspective

If left to the typical systems analyst or MIS researcher, effectiveness definitions would be based upon the planned perspectives (Weick 1984). However, the more appropriate perspective may be contingent upon the structuredness of the organization and its environment. Kling (1980) suggests that the planned perspective has greatest descriptive validity for organizations which have relatively few social groups and are relatively well controlled by agents with centralized authority. As the organization becomes more complex and decentralized, an organic view may be more appropriate. Lawrence and Lorsch (1967) suggest that overall, an open planned perspective is appropriate, however, the closed planned perspective may provide a good understanding in relatively homogenous and stable environments. Thus, a closed planned perspective may be more appropriate when the organization and its environment are simple and stable, while an open organic perspective may become more appropriate as the organization and its environment are more complex and turbulent.

This seems to be the case for different aggregation levels within the organization as well as for the organization as a whole. For example, based upon organizations' attempts to be rational in complex and changing environments, Thompson (1967) suggests that an organization's buffering of its technical level (the firm's transformation process such as the production floor) from the environment makes the closed planned perspective appropriate when evaluating at that level. Because it deals extensively with the environment, the institutional level (top management) is more appropriately viewed from the open planned and organic perspectives. Finally, the middle management level mediates between these two levels and thus should be viewed from a more closed organic perspective.

7.2 Level of Aggregation

Any level of aggregation, from individual to organization, may be appropriate depending upon the evaluation purpose. For example, the evaluation may be commissioned in order to allocate resources to competing MSS and non-MSS projects on a firm-wide basis. In this case, a firm level of aggregation may be appropriate. In contrast, reacting to an individual's grievance, union officials may desire an evaluation at the individual level.

In addition, the exploration of levels other than that which is of primary interest may be beneficial. For example, though the results of a psychological (individual level) MSS impact study cannot be simply aggregated to determine organizational impact, the psychological results can be combined with a sociological study (group or organization level) to gain a fuller understanding of organizational effects (Mahoney 1984).

7.3 Time Orientation

Just as the evaluation purpose affects the appropriate level of aggregation, it also affects the appropriate time orientation. MSS evaluations can be commissioned for resource allocation, system tuning, or opportunity surfacing purposes (Ginzberg and Zmud 1986). Resource allocation assessments such as feasibility studies tend to be reactive and control-oriented; these assessments typically have a present or near future time orientation. System tuning assessments such as quality assurance reviews tend to be preventative in nature with the purpose of assuring that the system continues to perform well; these assessments typically have a near future time orientation. Opportunity surfacing assessments are attempts to identify innovative uses of information systems; these assessments typically have a near to far future time orientation.

An important characteristic differentiating the three types of evaluation purposes is time orientation. As assessments move from resource allocation to system tuning to opportunity surfacing, the evaluation time frame shifts from present/short term concerns to future/long term concerns. This implies that resource allocation evaluations determine MSS effectiveness in a static sense: within the constraints of currently available resources, technology, and processes. However, as the purpose of the assessment changes to system tuning or opportunity surfacing, MSS effectiveness is defined in a more dynamic sense, where the potential impacts of currently unknown/unavailable resources, technologies, relationships, and processes are of interest.

In addition to evaluation purpose, entity and environment stability affect the choice of time orientation. In a "static world", with stable technology, relationships, etc. a short term static view of MSS effectiveness is appropriate: the potential for significant change need not be considered. However, when stability decreases, effectiveness evaluations should consider the potential effects of new technologies, relationships, etc., and take on a more dynamic orientation.

7.4 Domain of Analysis

Of the alternative domains of analysis, many researchers view the impact of MSSs upon outcomes as the most important indicant of effectiveness (Matlin 1979, Hamilton and Chervany 1981a, Ives, Olson, and Baroudi 1983). However, as the complexity or instability of the entity and its context increases, causal links between input structure, processes, and outcomes become less direct and more uncertain (Gremillion and Pyburn 1985, Crowston and Treacy 1986, McFarlan 1984a, Campbell 1977). Thus, though most desirable, the contextual complexity may not allow direct evaluation of an MSS upon entity outcomes.

In more complex and turbulent situations, where cause - effect relationships are unclear, the domain of analysis may be restricted to the effect of an MSS upon process (e.g., effect upon decision making speed). In this case, significant assumptions are made concerning the links between process and output (faster decisions enhance organizational competitiveness). With extreme contextual complexity and turbulence, the domain of analysis may be restricted to the impact of an MSS upon input structure (e.g., more information for decision making). Here, significant assumptions concerning

relationships between inputs through processes to outputs are made (more information results in better decisions which enhance organizational competitiveness).

7.5 Complexity, Turbulence, and Preeminence of the Evaluation Client

As described, appropriate positioning of an evaluation within the four effectiveness dimensions is contingent in part upon entity and environment complexity and turbulence. As complexity and turbulence increase it becomes more appropriate to move the MSS effectiveness focus from planned to organic, from closed to open, from static to dynamic, and from outcome to input structure (Figure 3). There are, however, two forces which lead evaluators to override these implications. First, closed planned models (e.g., associated with social psychology and economics) are typically better developed with more powerful (optimization) evaluation methods and tools than open organic models (e.g., associated with political and institutional theories). Thus, current practice tends to be "tool oriented", applying available methods and tools in less appropriate situations. This is evidenced, for example, with the use of cost-benefit analysis to evaluate MSS effectiveness in complex contexts (Keen 1981, King and Schrems 1978).

The second reason for ignoring complexity and turbulence implications pertains to the evaluation client. The client's evaluation purpose helps choose positions along the level of aggregation and time orientation dimensions. In addition, since clients commission and pay for evaluations, it should be ultimately up to them to decide what they want looked at in terms of the organization perspective and domain of analysis dimensions (Hamilton and Chervany 1981a and 1981b, Campbell 1977). This decision, however, should be

an informed one, based upon understanding the strengths and weaknesses of the effectiveness definition chosen and the alternative effectiveness definitions forgone. For example, a closed planned, organization, short term, process oriented evaluation may be deemed appropriate due to organization and environmental characteristics and available methods and tools. However it should be recognized that the effects of an MSS upon issues such as employee morale and firm adaptability are ignored; in addition, significant assumptions are made concerning the effects of organizational processes upon its products or services.

8. CONCLUSION

Evaluating MSS effectiveness is a pivotal component of information resource management. To aid this process, a variety of evaluation methods have been offered, but there is little theoretically based guidance to help choose between them, to indicate when new methods are required, or to help in creating new methods. This paper is in response to these problems, with the purpose of helping to create a cohesive theory of MSS effectiveness. The first step in theory creation is proper framing of the problem; that is, developing a better understanding of what MSS effectiveness really is.

This step is addressed here. It is proposed that effectiveness can be defined in terms of goal attainment, and that MSSs are useful to the extent that they aid managers in attaining those goals. MSS effectiveness, then, varies as goals vary; goals are posited to vary based upon a position within a 48 cell framework consisting of the following four dimensions: organization perspective, level of aggregation, time orientation, and domain of analysis (Figure 1). Resulting MSS effectiveness definitions range from helping

managers enhance firm profitability to firm survival to individual welfare to individual or coalition power, etc.

Global optimization of MSS effectiveness over all 48 cells is generally unattainable, since goals associated with the different cells tend to conflict: firm survival may depend upon reducing profits to increase market share, firm profitability may be sacrificed in order to increase the welfare of individuals, individual power may be at odds with coalition power, etc. Thus, for each evaluation, a position (or subset) within the framework must be chosen as the working definition of MSS effectiveness. The appropriateness of various definitions (cell positions) has been suggested by organization research based upon the complexity and turbulence of the entity and its context. However, the ultimate authority in deciding upon an effectiveness definition should generally be the evaluation client.

Though a complete effectiveness theory has not been created, an initial examination of the three questions which motivated this paper can be offered. The first question asked how the best (or most appropriate) method could be chosen. In accord with Ginzberg and Zmud (1986), and in contrast to Hamilton and Chervany (1981), evaluation method appropriateness is contingent upon the evaluation context. As discussed in the previous section, the complexity and turbulence of the entity and its environment as well as evaluation purpose result in certain MSS effectiveness definitions being more valid than others. However, the informed wishes of the client should be preeminant in determining the evaluation focus.

The second question asked if the methods currently available are adequate. By placing existing methods in the 48 cell framework, empty cells indicate a need for method development. This is done in Figure 4 with methods representing the breadth of those currently available to practitioners (Hamilton and Chervany 1981). Only two of the 48 cells have existing methods: outcome and input structure domains within a closed planned perspective, an organization level, and a static time orientation. There is thus a significant need for further method development.

This dearth of evaluation methods has led to their inappropriate use and thus poor MSS effectiveness evaluations. For example, overdependence upon cost-benefit analysis has resulted in a bias against decision support systems because associated benefits largely non-quantitative and non-economic (Keen 1981). Since the appropriate use of information resources may be the principal source of future growth for the U.S. economy (Jonscher 1983), methods which effectively aid in determining appropriate information technology development and use must be created.

Ginzberg and Zmud (1986) agree, stating that current evaluation methods were developed during a time when computers were used to automate isolated clerical processes. They suggest that new methods might be able to be transported from areas such as political analysis and organization development. Hirschheim and Smithson (1986) continue this argument, indicating that the underlying objectivist/rational conception of organizations and information systems has led to such limited methods. They state that significant improvement can only be attained through increased emphasis upon the social implications of systems, and adopting an

interpretivist (or subjective) perspective may be the best vehicle for accomplishing this.

The third question asked for guidance to enable new method development. The creation of appropriate evaluation methods is dependent upon the creation of appropriate theory. The framework developed here can serve as a framing mechanism for such research. Depending upon framework location, quite different notions of effectiveness exist which may imply quite different theories, ranging from psychological to sociological to economic, etc.

Validation of this framework comes from its basis in organization theory. It is valid to the extent that (this interpretation of) the work on organization effectiveness is valid and to the extent that the underlying assumptions are valid. The framework is more complete than that proposed by Hamilton and Chervany (1981). Their framework consists of a single efficiency - effectiveness dimension, and has a predominately closed planned perspective, organization level of aggregation, and static time orientation. In fact, the current methods illustrated in Figure 4 cover all aspects of their framework, as opposed to 2/48 of our framework.

In contrast, the framework offered by Ginzberg and Zmud (1986) includes all aspects of our framework, and offers additional issues such as the organization role of the information system and the potential of indirect effects. These additional dimensions were not focused on here; rather, the information system role was defined as an MSS, and only direct effects upon managers were considered. Though not explicitly considered in the organization theory literature, these additional complications are certainly

important, and provide good direction for future information systems effectiveness research.

Figure 1. Framework for Defining MSS Effectiveness

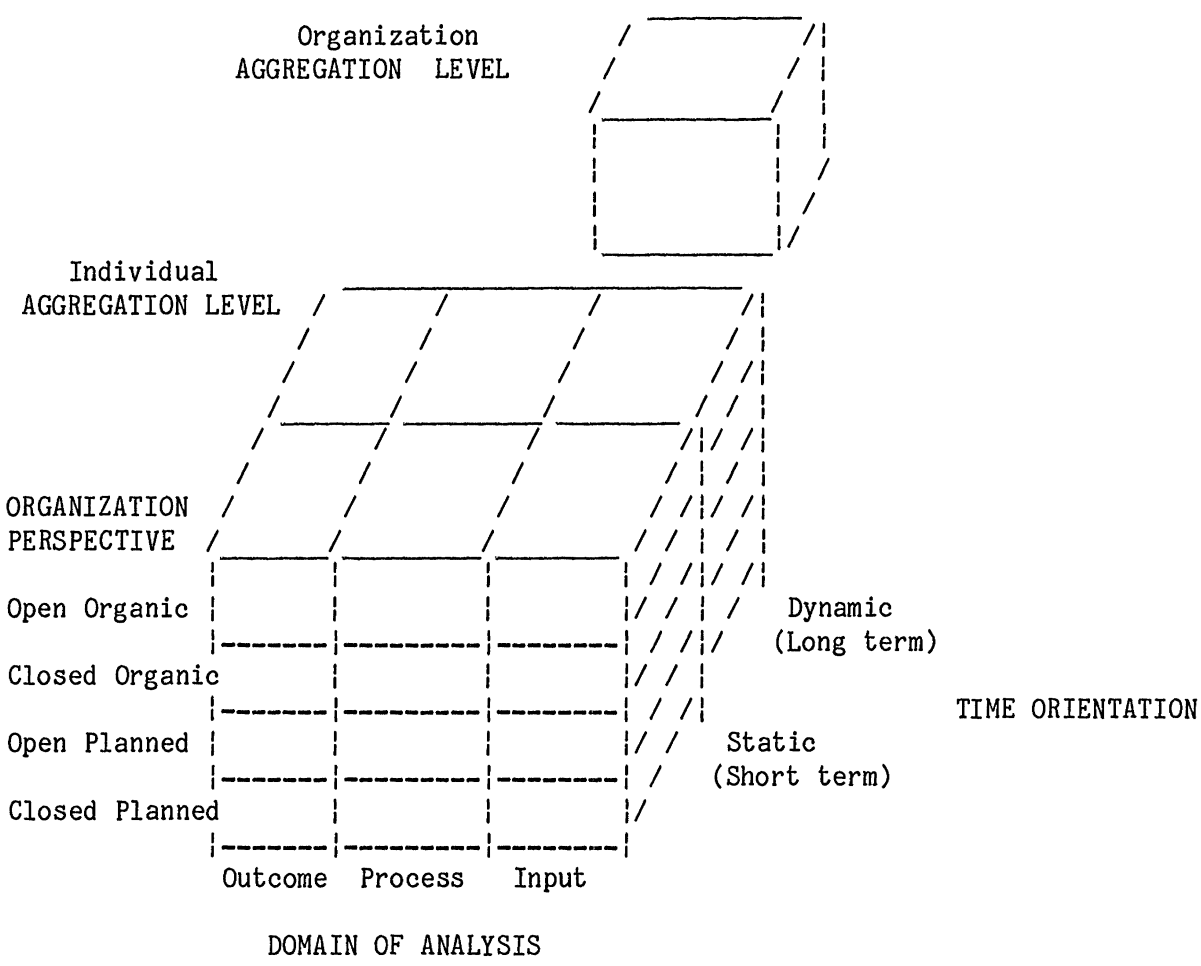


Figure 2a. Framework on Organization Perspective
at
Organization Level

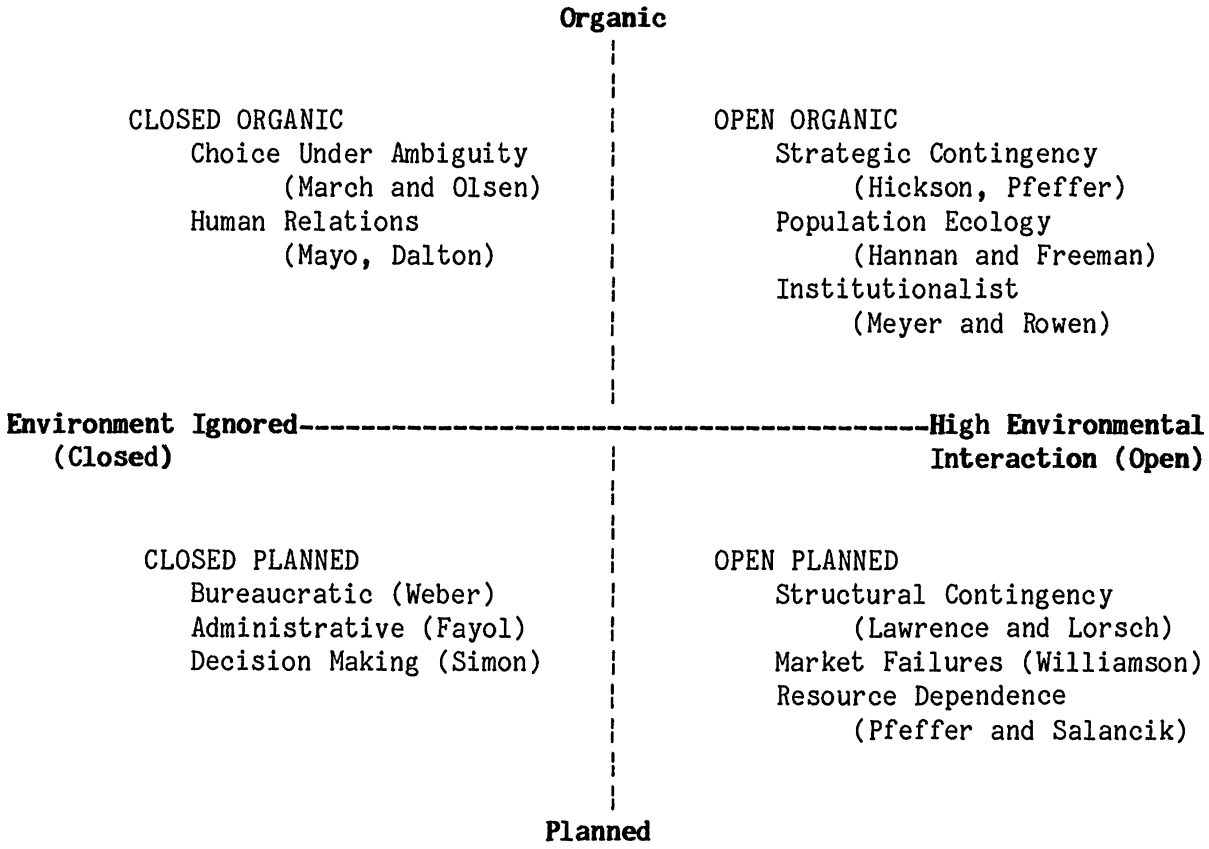


Figure 2b. Framework on Organization Perspective
at
Individual Level

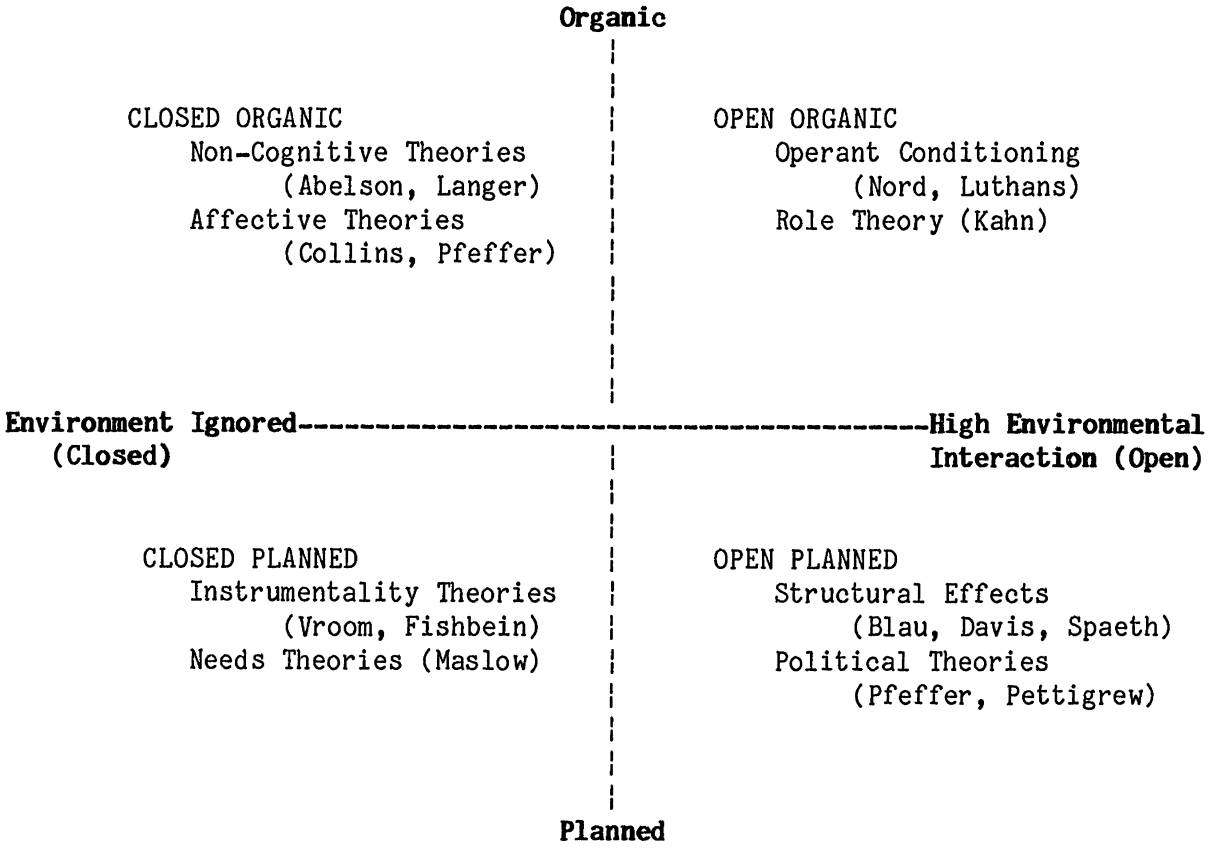


Figure 3. The Effect of Complexity and Turbulence on Organization Perspective, Domain of Analysis, and Time Orientation

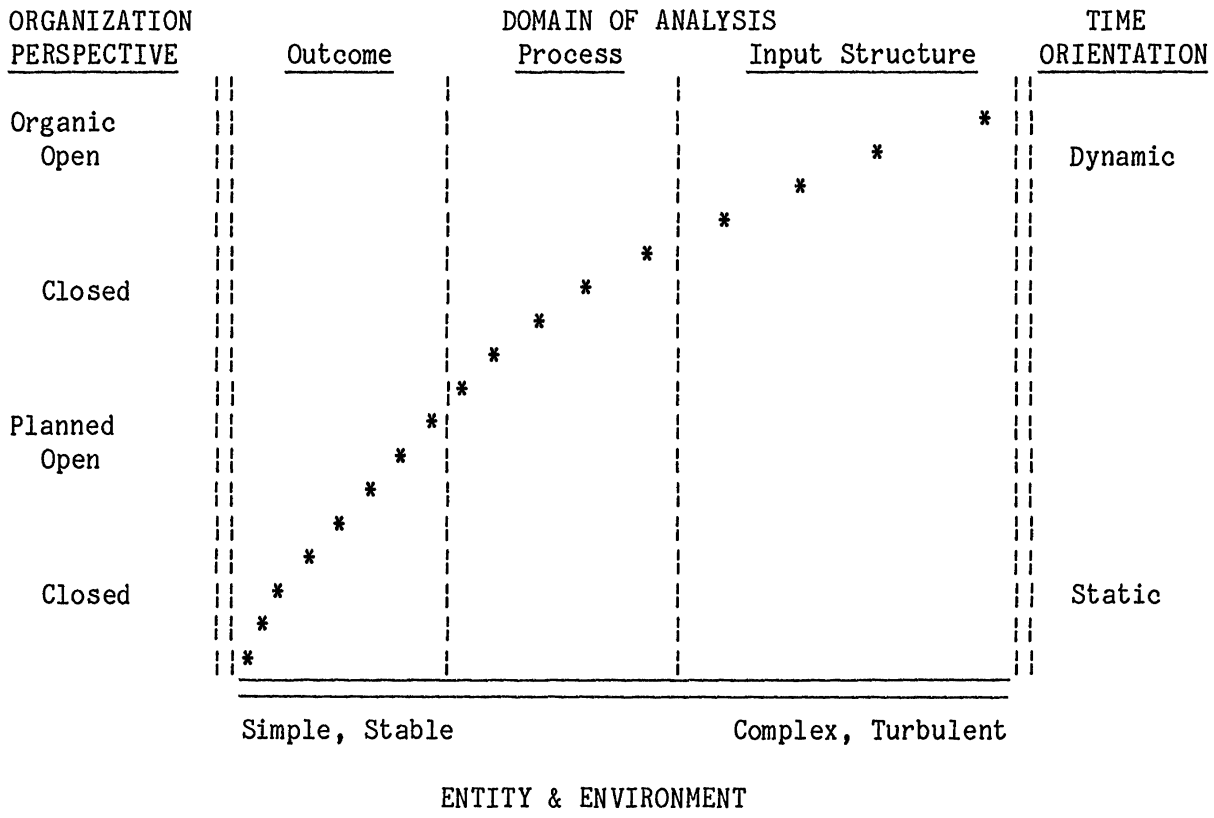
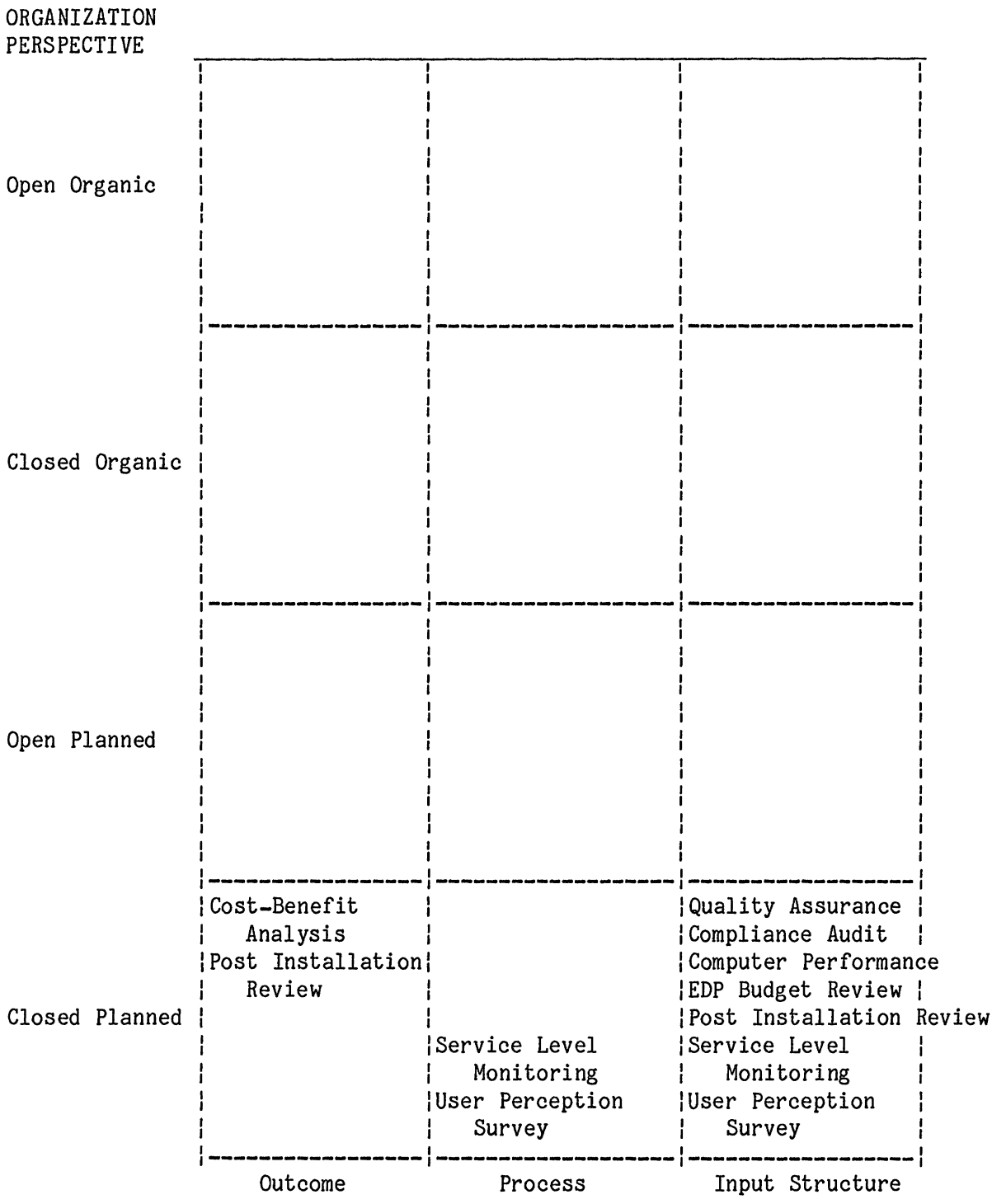


Figure 4. Positioning of Available MSS Evaluation Methods
at
Organization Level & Static Time Orientation



FOOTNOTES

1. There is also research focusing upon the impact of information systems on individual decision making. These studies typically use man-machine simulations to examine the interaction of information systems characteristics (such as table versus graph display) and individual user characteristics (such as different cognitive styles) in order to determine their effect upon decision characteristics (such as accuracy and response time) (see summaries in Dickson, Senn, and Chervany 1977 and in Jarvanpaa, Dickson, and DeSanctis 1985). In addition, there has been research in which information systems are evaluated through computer simulation alone (Cooper and Mackey 1988, Boyd and Krasnow 1963). However, these methods are not generally proposed for use by organizations to evaluate their information systems.

2. The term organizational theory is used to include organizational behavior, organizational design, as well as traditional organizational theory.

3. A material requirements planning system (MRP) is a computer system which uses information on finished goods demand and a model of the production process to help production management schedule the purchase and production of material.

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APPENDIX: DETAILS ON ORGANIZATION THEORIES
(Based Upon Scott 1987 and Pfeffer 1982)

ORGANIZATION LEVEL OF AGGREGATION

Section 3.1 Closed Planned

- o Bureaucratic Theory - (Weber 1947) In response to patrimonial organizations of his day, Weber developed a list of bureaucratic elements which would achieve organizational rationality. Rules and procedures (including a fixed division of labor among participants, a hierarchy of offices, a separation of personal from official property and rights, selection of personnel on the basis of technical qualifications) were to be developed which ensured the equal and fair treatment of all who came in contact with the organization. In addition, promotion opportunities within the firm would build loyalty to the organization and a willingness to comply with the rules and procedures.

- o Administrative Theory - (Fayol 1949) This perspective provided a set of management principles to help rationalize organizations. These principles include aspects of coordination such as hierarchic organizational form, unity of command (only one superior per subordinate), span of control (limiting number of subordinates per superior), and the exception principle (routine matters should be handled by subordinates with superiors handling exceptions). In addition, specialization principles are offered such as departmentalization (rules for combining related activities) and the segregation of line and staff personnel.

- o Decision Making - (Simon 1957) The organization should both simplify decisions and support participants in the decisions they need to make. One significant way to simplify decisions is to develop precise and specific goals. Organizational support of decision making should take the form of a formalized structure which divides responsibilities among participants and provides them with the necessary means (resources, information, and equipment). Specialized roles and rules, information channels, training programs, and standard operating procedures help restrict the range of decisions each participant makes and assists them in making the appropriate decisions within that range.

Section 3.2 Closed Organic

- o Choice Under Ambiguity - (March and Olsen 1976) Organizational goals are selected by a loose and shifting coalition. Actions often precede goals; preferences are neither precise nor stable. Rather than stable means-ends chains linking participants throughout the organization, behavior is characterized by exchange, combat, and of compromise and alliance.

- o Human Relations - (Mayo 1945, Dalton 1959) Individual workers are complex with multiple motives and values, and tend to act according to their feelings and sentiments. Informal status heirarchies and leadership patterns develop which challenge the formal systems designed

by managers. Loyalty to social groups may outweigh their individualistic self-interests. Thus, for example, they may conform to group norms restricting production at the expense of their own higher earnings. Organization management must appropriately consider individual differences among workers. Good supervisors exhibit a high degree of trust, friendship, and respect relative to their subordinates.

Section 3.3 Open Planned

- o Structural Contingency Theory - (Lawrence and Lorsch 1967, Udy 1959, Blau 1970, Galbraith 1973, Thompson 1967) Organizations act to produce congruence between organizational structure and the contextual factors that affect the appropriateness of those structures, where appropriateness is usually determined by efficiency but may be effectiveness. Contextual factors include organization size, technology (materials, operations, knowledge), environment (uncertainty, resource munificence, degree of competition), and firm strategy (industry leader versus follower). Organization structure factors examined include formalization, differentiation (vertical, horizontal), size of administration, centralization, complexity, span of control, and specialization.

- o Market Failures (Transactions Cost) - (Williamson 1975, Ouchi 1980) The existance and structure of organizations are due to gains in exchange efficiency when compared with the market system. Issues addressed include determining the efficient boundaries between the market and organization hierarchy (contracting versus hiring labor, the extent of vertical integration), the efficient form for a firm (limits of firm hierarchy, effectiveness of a multidivision form), and the efficient way of structuring exchange relations and incentives between the firm and its workers (hierarchy/bureaucracy versus clan/socialization methods of monitoring and control).

- o Resource Dependence - (Pfeffer and Salancik 1978) Organizations are not internally self sufficient; they require resources from other organizations which leads to interorganizational influence (power). Managers attempt to manage their external dependencies to ensure the survival of the organization and to acquire more autonomy and freedom from external constraint (i.e., increase their interorganizational power).

Section 3.4 Open Organic

- o Strategic Contingency - (Hickson et al. 1971, Pfeffer 1978) Organizations are made up of coalitions which differ in their interests and power. The primary source of power is from the ability of a coalition to decrease environmental uncertainty (uncertainty absorption - March and Simon 1958, Galbraith 1973) which leads to greater organizational stability and survival. This power is a determinant in later contests providing participants further advantages in the political struggle because of their structural (subunit) position. Thus, organizational structures and the response of an organization to its environment result from political contests within the organization.

- o Population Ecology - (Hannan and Freeman 1977b, Adlrich 1979) Changes in populations of organizations occur, in part, because of the operation of selection processes working on those organizations. The importance of selection comes from the internal and external constraints on the adaptability of organizations. Internal constraints include sunk costs, limited information to decision makers due to present activities and structures, internal politics inhibiting redistribution of resources, and historical and traditional inertia. External constraints include legal and financial barriers to market entry and exit, external constraints on information availability, etc. The focus is upon population dynamics: observing the time path as equilibrium is approached.

- o Institutionalist Theory - (Meyer and Rowen 1977, DiMaggio and Powell 1983) There are shared, institutionalized views in the environment about what organizations should look like and how organization work should be performed. In order to maintain their legitimacy, organizations fulfill expectations of the environment by incorporating these views in their structure, rules, and reporting requirements. In many cases merely the form rather than the substance of these views are adopted, resulting in little impact on task performance and the behavior of organization members.

INDIVIDUAL LEVEL OF AGGREGATION

Section 4.1 Closed Planned

- o Instrumentality Theories - (Vroom 1964, Fishbein 1967, Dulany 1968) Instrumentality theories hypothesize that an individual's behavior is determined (in part) by his expectations that the behavior will lead to various outcomes and his evaluation of these outcomes. Expectency theory is an example, where the motivation for a behavior is a function of the anticipated satisfaction associated with the outcome of the behavior and the potential for achieving the outcome with the behavior. Expectency theory has been augmented to include the effects of normative social control with, for example, Dulany's theory of propositional control and Fishbein's theory of the effects of attitudes upon behavior.

- o Needs Theories - (Maslow 1954, Alderfer 1972, Salancik and Pfeffer 1977) Needs such as for interesting, autonomous, and responsible work are important goals sought by individuals. Preferences are developed according to the manner in which states of the world satisfy these needs. Satisfaction and work performance are a thus function of the extent to which the job facilitates the attainment of these needs. Managers should provide jobs that facilitate the satisfaction of higher-order needs.

Section 4.2 Closed Organic

- o Non-Cognitive Theories - (Abelson 1976, Langer 1978) Cognitive theories assume that individuals are information processors, continuously questioning and applying rules to govern behavior. In contrast, non-cognitive theories question how much time people spend in any kind of thoughtful action. Action seems to be dictated as much by habit or automatic behavior (e.g., scripts) as by thought.

- o Affective Theories - (Collins 1981, Pfeffer 1982) Organizations are held together by affect or emotion. People follow routines because they feel natural or appropriate. The basis of the affect is in the relationship of people with each other rather than the relationship of people with their environment (including tasks and task attributes). Affiliative implications of task and organizational design have significant consequences for an organization's operations.

Section 4.3 Open Planned

- o Structural Effects - (Blau 1960, Davis, Spaeth, and Huson 1961) Group norms and the individual's context are seen to affect an individual's attitudes and behaviors. For example, an individual's behavior or attitude is postulated to be a function of the individual's initial attitude, the group mean attitude, and the deviation of the individual from the mean. Such conformity with group norms is rewarded with acceptance into the group.

- o Political Theories - (Pfeffer 1981, Pettigrew 1972, French and Raven 1959) Individuals act in their own self-interest and engage in strategic action in pursuing this interest. Power (the ability of an actor to overcome opposition) determines whose interests tend to prevail in conditions of conflict. Power can be virtually defined by the relationship between the preferences of an actor and the outcomes achieved. There are at least five bases of individual power: reward power (ability to provide inducements), punishment power (ability to provide sanctions), expert power (ability to use expertise to reduce uncertainty), legitimate power (based upon authority associated with a role), and referent power (personal characteristics which others want to emulate such as articulateness, sensitivity, social adeptness, competence, popularity).

Section 4.4 Open Organic

- o Operant Conditioning - (Nord 1969, Luthans and Kreitner 1975) Based upon Skinner's (1953) work, behavior is thought to be strictly a function of the consequences of that behavior. Thus, behavior that is desired should be rewarded (reinforced) and that not desired should be unrewarded or punished. Behavior is a reaction to the environment (behavior must be first emitted and then reinforced to be learned); intentional behavior is not postulated.

- o Role Theory - (Kahn et al. 1964) Organizations are systems of mutual social constraint in which the activities of an individual are determined by the demands and expectations of others in his "role set". Independent of personal characteristics, the behaviors of various people in a specific role would be similar because of these role pressures and expectations. The following forms of role conflict have been postulated: conflicting (incompatible) role demands, inter-role conflict (e.g., roles at work versus family), person-role conflict (role conflicts with person's ethics, morals, etc.), and role ambiguity (uncertainty about the role demands).