

A Typology of Organization Typologies: Toward Parsimony and Integration in the Organizational Sciences

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Numerous typologies have been offered for sorting the major contingencies of organizational functioning. Types of effectiveness, environments, technologies, structures, controls, strategies, goals, decision-making processes, leadership styles, job designs, and cognitive preferences, are just some examples. This paper proposes that the variations in each typology tend to follow a pattern, and that this pattern can be captured by the broader dimensions of closed versus open systems and technical versus social systems. It is argued that greater parsimony and integration of the organizational sciences are achieved by defining, sorting, and researching contingency variations according to the four resulting categories: closed-technical system, closed-social system, open-technical system, and open-social system. This paper concludes with suggestions for new research directions that follow from this metatypology.

INTRODUCTION

In the past few decades, numerous contingency theories have been formulated and researched in reaction to the universal theories of earlier times. Rather than proposing the single best leadership style, organization structure, conflict-handling behavior, organization-control mechanism, or even the "standard" set of management principles, academics have found it useful to distinguish types, styles, modes, forms, and processes of organi-

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zational functioning. Further, these various distinctions are seen as fitting with some aspect of organizational effectiveness depending upon related distinctions in the situation or the organization's environment.

For example, consider a broad sampling of contingency theories according to the types of distinctions examined: Burns and Stalker (1961) conceptualize two types of organization structure, Woodward (1965) distinguishes three types of technological processes, Lawrence and Lorsch (1967) explore two types of departmental structure, Perrow (1970) considers five types of organizational goals, Van de Ven (1976) examines four types of work-unit structures, Kast and Rosenzweig (1973) define two types of strategic-decision processes, Pondy (1967) outlines three types of organizational conflict, Tannenbaum and Schmidt (1958) present four styles of leadership behavior, Vroom and Yetton (1973) describe three types of decision-making processes, French and Raven (1959) develop five bases of social power, Herzberg, Mausner, and Synderman (1959) study two types of motivational factors at the workplace, Bavelas (1950) contrasts the effects of two types of communication nets, Likert (1961) summarizes four types of organizational systems, Emery and Trist (1965) suggest four types of organization environments, Parsons (1960) and Katz and Kahn (1966) make use of three levels of organization hierarchy, Thompson and Tuden (1956) formulate four types of decision-making and tests of organizational performance, Emery (1974) implies three different types of organization-control mechanisms, Ansoff and Brandenburg (1971) suggest four criteria of organizational performance and four types of organizational forms, Perrow (1967) proposes four types of technology, Bowers and Seashore (1966) conclude that there are four basic types of leadership behavior, and Mitroff and Kilmann (1966) examine four cognitive styles of managers. All of these typologies have been shown to relate in some way to various aspects of organizational effectiveness.

With such a variety of types of distinctions, one may be quite pessimistic about the possibility for developing parsimonious and integrated theories of organizations. It seems that for every aspect of organizational functioning, a different typology is offered. Ironically, a typology is useful only if it reduces the redundancy and complexity of many variables and if it creates order among fundamentally different perspectives. *When there are as many typologies offered as there are variables*, then the complexity has not been reduced and ordered—rather, the complexity has been exaggerated. A *metatypology* is then necessary to reduce the redundancy and complexity of the many competing typologies. This will help to keep the field and its paradigms in a manageable state, allowing for meaningful and productive debates. However, when the field develops “too many” of these metatypologies, then an even broader set of dimensions should be formulated to move the field forward (Burrell & Morgan, 1979).

THE UNDERLYING DIMENSIONS

This paper offers one metatypology for sorting the many types, styles, modes, forms, and processes of organizational functioning that have been proposed. To do this one must identify the repeating patterns or themes. The critical assumption is that all the typologies mentioned earlier are not independent. In fact, *it is assumed very explicitly that the same underlying set of dimensions is being conceptualized and researched over and over again*. If this turns out to be the case, then the repeating dimensions become the basis for integrating the various typologies into a broader, metatypology—allowing for a larger set of variables to be included (across a wide range of organizational functioning) and suggesting a more parsimonious set of dimensions on which to research these organizational variables. Mintzberg's (1979) "five types of organizations" and, more recently, Van de Ven and Astley's (1981) "four views of organization and behavior," are related efforts in this direction.

Open System Versus Closed System

In reviewing the major contributions to organization theory during the past decades, I find that the difference between the open and closed system is fundamental. Katz and Kahn (1966), building upon the systems framework established by von Bertalanffy (1950), suggest the importance of viewing organizations as open systems in contrast to the closed systems view of bureaucratic theory (Weber, 1947). Thompson (1967) similarly emphasizes that organizations should be viewed as *both* open and closed systems: where the technical core (as in production departments) can act as if it were closed (due to buffers, smoothing, and rationing), while the adaptive subsystems (as in strategic planning) must respond to the dynamic aspects of the environment if the organization is to survive in the long run.

This distinction of open versus closed system is well established in the literature. It is a recurring theme that has been identified and explored by many researchers. It is seen as the classic discussion of environmental adaptation and survival versus efficiency of operations and productivity.

Technical System Versus Social System

A second fundamental distinction that occurs again and again concerns the differences between an impersonal, logical, orderly, and "hard" resource-based organization versus a personal, subjective, unique, people-oriented approach to organizational functioning. The former views people as just another factor in the production function while the latter sees

people as requiring special attention and managing beyond what is done for the other tangible resources. The social system, therefore, concerns people as people, with special needs, wants, fears, anxieties, defenses, pathologies, and so forth. The technical system involves the management of labor, capital, information, budgets, tasks, and so on, without treating labor in any manner different than the other types of resources.

The technical versus social system distinction is very prevalent in the literature, representing the classic debate between sociologists and psychologists, for example. The former ignore individual differences in examining functional relationships while the latter seem to put more weight on the person versus the situation. The debates between “technocrats” and “humanists” are reflective of this fundamental distinction, also.

A Typology of Typologies

Combining these two fundamental distinctions results in four types of organizational systems, as shown in Fig. 1: closed-technical system, closed-social system, open-technical system, open-social system. These bear some similarity to the four types of systems identified by system theorists (Ackoff & Emery, 1972): a deterministic system, a purposive system, a goal-seeking system, and a purposeful system, respectively. To help define the character of each of the four systems, Fig. 1 also plots some of the “classic” works that highlight these distinctions.

Max Weber’s (1947) discussion of bureaucracy is the purest case of the closed-technical system. Here, all concentration is on the internal workings of the organization with no attention to environmental factors. Also, the approach is highly impersonal as it views people as “officials” without personality or individual variations.

Roethlisberger and Dickson (1939) discovered some of the ignored side of human beings: their needs for special attention and social affiliation. While these researchers focus only on the internal aspects of organizations, they laid the groundwork for the human relations movement and the awareness of the informal organization. The latter is a fine example of a closed-social system with particular regard to the culture and norms of work groups.

Von Bertalanffy (1950) spelled out the essence of open systems theory from the biological and physical sciences. The various principles, however, did not treat individual variations and differences so much as outline the properties of a system in the context of an environment; hence, this treatment is very much of an open-technical system. Growth, adaption, change, and evolution could now be seen as efforts to maintain a dynamic equilibrium—quite different from the conflict-reducing, stable state of bureaucracy.

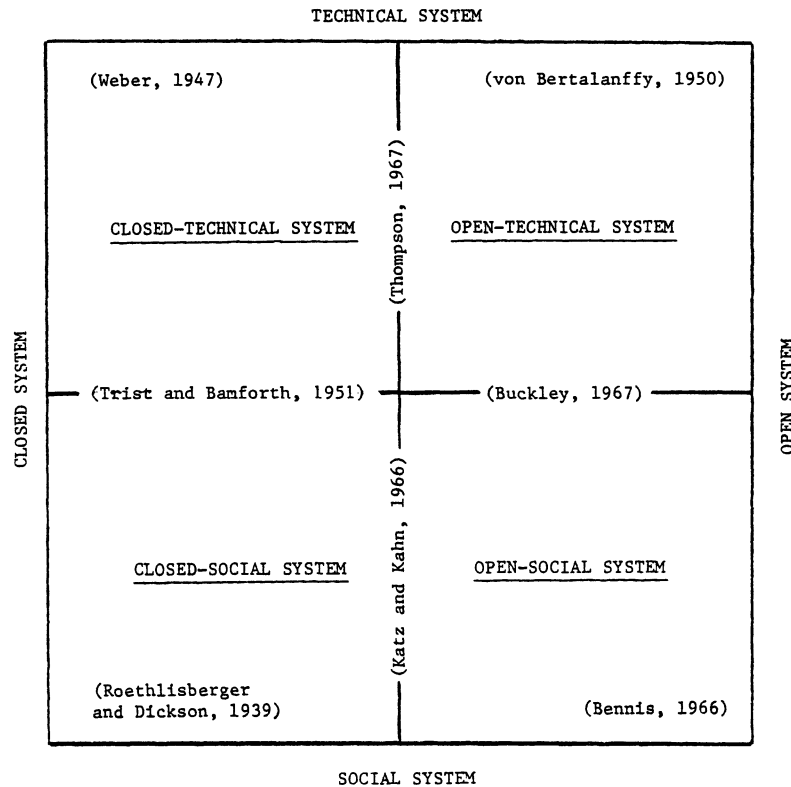


Fig. 1. Four types of organizational systems.

Bennis' (1966) concept of the organic-adaptive organization best describes the open-social system. Temporary groups, made up of individuals with special areas of expertise and personalities, are asked to define and solve complex problems. When these problems are solved, the groups disband and form into some new, temporary arrangement, again based on special needs for expertise and different perspectives. Individuals would have to be skilled at forming close, effective interpersonal relationships in a short period of time and be able to leave these relationships and form new ones as the problems and groups change. These temporary groups, therefore, are seen by Bennis as allowing the organization to adapt to a complex and changing environment.

A number of authors can be plotted at the interface of these four systems, representing an effort to integrate some of these fundamental distinctions. Trist and Bamforth (1951) are the forerunners of what has

become known as the sociotechnical systems approach to job design: an integration of the closed-technical and the closed-social system. While being primarily concerned with the production process (closed system), a special effort is made to reconcile the impersonal, technical features of the work with the motivational and cognitive needs of the workers. Katz and Kahn (1966) conceptualize the organization at three levels: the technical level (closed system), the institutional level (open system), and the management level (interfacing between open and closed aspects of the system). Because of Katz and Kahn's concerns about the variety of individual needs and motives, these authors are placed in the social system side of the interface. Thompson (1967), however, is placed on the technical side of the closed/open system interface. He too considered three levels of organization (technical core, institutional, and mediating) but he relied more on functional roles than on individual differences to reconcile the open/closed tension of organizational systems. Finally, Buckley (1967) represents the open system view but provides examples and discussions of interfacing the technical and social system concerns.

INTEGRATING THE CONTINGENCY THEORIES

Any contingency theory contains the following relationships among the concepts in the theory: depending upon the particular quality of the uncontrollable givens in the situation, the more that the controllable variables have qualities that are congruent to the givens, the more that some aspect of organizational effectiveness is likely to be attained, all else being equal. Contingency theories assume that a matching of controllable and uncontrollable variables does make a difference in organizational outcomes and performance. The alternative type of theory is to discover that one approach is more effective regardless of the state of various situational variables (a universal theory); the other alternative is to find that any universal or contingent state of variables makes little or no difference on desired organizational outcomes (an irrelevant theory). Therefore, contingency theories are useful only if they show (through empirical studies) that matching one set of variables to the givens in the situation leads to desired outcomes better than any other type of theory or paradigm.

It should be noted that Schoonhoven (1981) has argued that there are several basic problems with phrasing contingency theory in this manner. Specifically, she finds that terms such as "congruent," "match," "fit," "alignment," "is appropriate for," and so on, result in a lack of clarity regarding the kind of relationship among variables that is being hypothesized. Is the relationship one of interactive (multiplicative)

propositions? Of what functional form of interaction? Is the relationship linear or nonlinear, symmetric or asymmetric, over the full range of values for each variable? Ironically, Schoonhoven's study showed that empirical support for a contingency theory was stronger (rather than weaker) when hypotheses were reformulated precisely vis-à-vis her questions of functional relationship than when contingency hypotheses were left as loosely stated, linear, interaction effects.

It is not the purpose of this paper to critique or rephrase each contingency theory according to these important questions. Rather, this paper examines another reason why contingency theories have not resulted in theoretical integration—not seeing these theories as reflecting a more generic set of dimensions, regardless of topical focus. Certainly, a lack of clarity among the variables in the contingency theories may have clouded the issue of integration. However, the various contingency theories can still be sorted via the underlying dimensions even though the specific relationships among variables need greater precision and additional empirical research.

Perhaps the proper sequence for identifying and sorting any contingency theory requires that one specify: (i) the desired outcomes or efficiency/effectiveness criteria, (ii) the givens in the situation (qualities thereof), (iii) the “congruent” states or qualities of controllable variables, and (iv) the evidence to date that bears on the support (or rejection) of the theory. In order to integrate the various contingency theories that have been developed, the next sections define (i), (ii), (iii), and (iv) all according to the four types of organization systems shown in Fig. 1. Furthermore, each of the four types of systems will be examined across a wide range of controllable variables to demonstrate the breadth of the metatypology. The range of controllable variables includes: macro design, decision processes, influence processes, micro design, and individual/system interfaces.

The Closed-Technical System

As shown in Table I, this aspect of organizational functioning is most concerned with efficiency and productivity. Authors such as Ansoff and Brandenburg (1971) conceptualize this as steady-state efficiency; Katz and Kahn (1966) label this as technical efficiency; Mott (1972) calls this the production criterion and identifies three variables: quantity, quality, and efficiency; Kilmann and Herden (1976) define this as internal efficiency: maximizing the outputs from a set of inputs but not worrying from where the inputs came nor where the outputs are going, whether members are motivated to perform the transformation process, nor anticipating whether the outputs are ever desired by consumers.

Table 1. The Closed- Technical System

Organizational variables		Congruent state or quality	Supporting reference
Desired outcome:	Efficiency/Effectiveness	Steady-state efficiency	Ansoff & Brandenburg (1971)
Given:	Environment	Internal efficiency	Kilman & Herden (1976)
Controllable variable:	Macro Design	Placid, randomized	Emery & Trist (1965)
	Technology	Routine	Perrow (1967)
	Structure	Bureaucratic	Weber (1947)
	Controls	Rules and Procedures	Ouchi (1979)
	Decision process		
	Goals	Product	Perrow (1972)
	Decision-making	Computational	Thompson (1967)
	Evaluation	Efficiency tests	Thompson (1967)
	Influence process		
	Authority	Top management	Ansoff & Brandenburg (1971)
	Power	Legitimate/reward/coercive	Katz & Kahn (1966)
	Leadership		
	Style	Tell	Tannenbaum & Schmidt (1958)
	Behavior	Facilitation of work	Bowers & Seashore (1966)
	Skills	Technical	Katz & Kahn (1966)
	Micro design		
	Job design	Routine-service unit	Van de Ven (1976)
	Architecture	Work-flow design	Ullrich & Wieland (1980)
	Individual/system interface		
	Locus of control	Situation	Mott (1972)
	Member needs	Physiological/safety	Maslow (1954)
	Cognitive style	Sensation-thinking	Mitroff & Kilmann (1976)
	Conflict	Bureaucratic	Pondy (1967)

The major given for each system type is the nature of the environment faced by that system. In the case of the closed-technical system, a stable, certain, predictable, well-defined, homogeneous type of environment tends to exist. In fact, without such an environment it would be impossible to achieve steady-state efficiency or internal efficiency. Whether this stable, certain environment exists on its own (Lawrence & Lorsch, 1967) or is "created" by buffers, smoothing, and rationing (Thompson, 1967), is immaterial. Emery and Trist (1965), in conceptualizing the causal texture of organization environments, referred to this situation as "placid, randomized."

The givens in this case also might include the technology to produce the outputs from the inputs efficiently, although even technology is alterable in the long run. Thompson's (1967) long-linked technology, Woodward's (1965) mass-produced technological process, and Perrow's (1967) routine technology, describe the technology of this closed-technical system quite well. Developing teams around portions of the long-linked technology as is done for Saab by the sociotechnical systems approach (Norsted & Aguren, 1975), is one alternation that may decrease internal efficiency even if it increases other organizational outcomes (e.g., motivation and commitment, as in internal effectiveness).

The controllable variables under the closed-technical system are numerous (defined as variables that are directly under the control of management and members in the short run, say one year). First, the organization structure most congruent with efforts at internal efficiency is bureaucracy (Weber, 1947). Ansoff and Brandenburg (1971) define this as centralized functional; Katz and Kahn (1966) refer to this as hierarchical structure; Burns and Stalker (1961) label this as mechanistic structure; Likert (1961) describes this as System 1 (autocratic). The control mechanisms to monitor, guide, and control behavior in such a structure have been referred to as bureaucratic rules and procedures by Perrow (1972) and Ouchi (1979).

The list of controllable variables continues. The goals tend to be specific attributes of products and services (Perrow, 1972); decision-making consists of rational, computational approaches (Thompson, 1967); efficiency tests are used to assess the quality of decision-making (Thompson, 1967); top management tends to be the major authority or locus of decision-making (Ansoff & Brandenburg, 1971); legitimate power and reward/coercive power are the primary bases for top management's authority (Katz & Kahn, 1966); the "tell" style of leadership works best in this setting (Tannenbaum & Schmidt, 1958); leadership behavior concentrates on the facilitation of work (Bowers & Seashore, 1966), as supported by technical skills (Katz & Kahn, 1966), as organized into the job-design

type known as a “routine-system unit” (Van de Ven, 1976). The primary culture of such a routine-system unit would consist of work norms, and even the workspace architecture would consist of the “workflow” design. Conflicts that emerge from such a system of organization have been referred to by Pondy (1967) as “bureaucratic conflict.”

Because the situation of the closed-technical system can be so finely specified and regimented, the situation seems to have a more controlling influence than individual personalities and motivations (as on the assembly line). The closed-technical system assumes, either implicitly or explicitly, that members are largely reactive, are oriented primarily to economic and security needs (Maslow, 1954), hygiene factors (Herzberg et al., 1959), and have a cognitive preference for order, details, and logical arrangements of work, as in “sensation-thinking” (Mitroff & Kilmann, 1976).

The Open-Social System

The “complete opposite” of the closed-technical system is the open-social system, as shown in Table II. The criteria of effectiveness include adaptability, responsiveness, relevance to society, and long-term survival. Ansoff and Brandenburg (1971) use the term “strategic responsiveness” to describe the performance criteria; Katz and Kahn (1966) refer to political effectiveness; Pickle and Friedlander (1967) examine “parties-at-interest” who determine organizational success (owners, customers, suppliers, community members, etc.). Kilmann and Herden (1976) define “external effectiveness” as the relationship between the organization and its environment, but not the technical or strictly informational exchange. The emphasis is on the rapport or commitments that can be developed with external clients and segments, and the extent to which the organization provides some useful and meaningful product or service—as measured by assessments of satisfaction.

The situation or environment that is a given for the open-social system is dynamic, uncertain, unpredictable, ill-defined, and heterogeneous. Emery and Trist (1965) label this type of environment as a turbulent field. Thompson (1967) refers to this environmental flux as posing severe uncertainties or exigencies for the organization—suggesting that cause-effect relationships cannot be discerned. Not surprisingly, the effectiveness criteria of adaptiveness and responsiveness are essential for managing or even approaching success in such an environment. Stated differently, external-effectiveness criteria would be meaningless if the environment were stable and certain.

The technology that would be employed in such a dynamic environment, either as a given or a controllable (changeable) variable, has been

Table II. The Open-Social System

	Organizational variables	Congruent state or quality	Supporting reference
Desired outcome:	Efficiency/Effectiveness	Strategic responsiveness	Ansoff & Brandenburg (1971)
Given:	Environment	External effectiveness	Kilman & Herden (1976)
		Turbulent field	Emery & Trist (1965)
Controllable variable:	Macro design	Nonroutine	Perrow (1967)
	Technology	Organic-adaptive	Bennis (1966)
	Structure	Professional standards	Hall (1968)
	Controls		
	Decision process		
	Goals	System goals	Perrow (1972)
	Decision-making	Disjointed incrementalism	Lindblom (1965)
	Evaluation	External social tests	Thompson (1967)
	Influence process		
	Authority	Dominant coalition	Thompson (1967)
	Power	Referent/expert	Katz & Kahn (1966)
	Leadership		
	Style	Consult/join	Tannenbaum & Schmidt (1958)
	Behavior	Supportive of clan	Bowers & Seashore (1966)
	Skills	Institutional	Katz & Kahn (1966)
	Micro design		
	Job design	Development-group unit	Van de Ven (1976)
	Architecture	Symbols and comforts	Ulrich & Wieland (1980)
	Individual/system interface		
	Locus of control	Individual	Mott (1972)
	Member needs	Esteem/self-actualization	Maslow (1954)
	Cognitive style	Intuition-feeling	Mitroff & Kilmann (1976)
	Conflict	Bargaining	Pondy (1967)

viewed as intensive by Thompson (1967) and nonroutine by Perrow (1967)—as illustrated by the aerospace industry, for example. The intensive technology is also utilized in research laboratories and hospital emergency rooms. The problem at the moment would suggest what tasks and activities need to be performed by a variety of people possessing different skills. Perhaps the extreme case of an intensive, nonroutine technology is where the technological process resides in the professional training of members, rather than viewing a technology as a tangible machine or apparatus. Thus, professionals carry their “technologies” around with them to be used when necessary and appropriate, even if this knowledge base and skill training is supplemented by various tools and aids (e.g., lasers or the computer). The debate of bureaucratic versus professional organizations may have been promoted by this difference in technology and the other differences between the closed-technical versus the open-social system (Hall, 1968).

The organization structure most congruent with the turbulent environment and most able to achieve adaptiveness and responsiveness (external effectiveness) has been discussed by Bennis (1966) as “organic-adaptive,” a composite of temporary, interacting groups that change as the environment or problem changes. Certain collateral organizations (Zand, 1974) have these same structural characteristics. Ansoff and Brandenburg (1971) suggest the “decentralized divisional” form of organization for fostering adaptiveness and strategic-responsiveness. Katz and Kahn (1966) describe the attributes of the professional or democratic organization. Burns and Stalker (1961) have researched the “craft” form of organization.

The control mechanism that would guide behavior best with these adaptive structures has been referred to as professional norms, standards, and values (Hall, 1968). This concept of control has been discussed as a cosmopolitan orientation (Gouldner, 1958), and the term “clan” has been used to describe this professional type of control mechanism (Ouchi, 1980).

The goals of the open-social system of organizations have been discussed as “system goals” by Perrow (1970). These include such concerns as growth, stability, research, and the characteristics of the organization itself (in contrast to its products or services). Also included under system goals would be the notion of how the goals should respond to environmental changes (i.e., goal adaptation). Consequently, the primary focus of managerial attention is at the institutional level (Katz & Kahn, 1966), recognizing that the primary stakeholders to the organization are community members and external institutions (Ullrich & Wieland, 1980) who are represented on the firm’s board of directors (Pfeffer, 1972, 1973). Decision-making, largely of the strategic type, takes place through “disjointed incrementalism” (Lindblom, 1965), as conducted by the dominant coalition via external social tests (Thompson, 1967)—in contrast

to rational decision-making according to the formal lines of authority on the organization's chart.

Because of the dynamic, uncertain, turbulent environment, only an organic-adaptive structure controlled by clans via strategic decision processes could hope to achieve strategic responsiveness. Congruent with this "macro design" is leadership behavior that is supportive of clan members (Bowers & Seashore, 1966), relying perhaps more on consultative and join leadership styles than tell or sell (Tannenbaum & Schmidt, 1958), as supported by institutional skills (Katz & Kahn, 1966). The culture of the clan or "development group unit" (Van de Ven, 1976), would be operationalized as professional norms of conduct and behavior. Here the primary bases of power would be referent, expert, and information power (Katz & Kahn, 1966). The type of conflict that would emerge from this system of organization has been described as bargaining conflict (Pondy, 1967), representing the kind of sociopolitical behavior manifested at the institutional level of organizations. Architectural designs would reflect the symbols and comforts supportive (congruent) with this kind of clan setting.

The many "degrees of freedom" in the open-social system imply that individual attitudes and behavior can have a controlling influence on the outcomes in comparison with the dictates of the situation itself. Thus, at the institutional level, one expects individual needs, motives, self-interests, and values to play a greater role in decisions and actions than occurs at the closed-technical system, for example. The individual needs that are likely to be activated in the open-social system involve esteem, power, and self-actualizing needs (Maslow, 1954), relative to physiological and safety needs. Herzberg et al.'s (1959) growth factors and content factors of the job would be more salient also. Lastly, the cognitive preferences of individuals who function well in this setting would include the ability to perceive the whole situation and the future implications of present trends and developments, coupled with a subjective, personalistic style of decision-making, as in "intuition-feeling" (Mitroff & Kilmann, 1976).

The Open-Technical System

The mediating level (Thompson, 1967) or the managerial level (Katz & Kahn, 1966) provides the intended integration between the open-social system (institutional level) and the closed-technical system (technical level). It is the reconciliation of short-term and long-term orientations, and the management of various technical variables, that concerns the open-technical system, as shown in Table III. The closed-social system, discussed in the next section, provides the "informal" organizational support for the

Table III. The Open-Technical System

	Organizational variables	Congruent state or quality	Supporting reference
Desired outcome:	Efficiency/Effectiveness	System resource	Yuchtman & Seashore (1967)
Given:	Environment	External efficiency	Kilman & Herden (1976)
Controllable variable:		Placid, clustered	Emery & Trist (1965)
	Macro design	Problem-solving	Perrow (1967)
	Technology	Dual structures	Davis & Lawrence (1977)
	Structure	Market mechanisms	Ouchi (1979)
	Controls		
	Decision process		
	Goals	Efficiency criteria	Yuchtman & Seashore (1967)
	Decision-making	Judgment	Thompson (1967)
	Evaluation	Instrumental tests	Thompson (1967)
	Influence process		
	Authority	Professional	Hall (1968)
	Power	Expertise/information	Katz & Kahn (1966)
	Leadership		
	Style	Sell/consult	Tannenbaum & Schmidt (1958)
	Behavior	Emphasis on goals	Bowers & Seashore (1966)
	Skills	Administrative	Katz & Kahn (1966)
	Micro design		
	Job design	Specialist-system unit	Van de Ven (1976)
	Architecture	Flexible work arrangements	Ullrich & Wieland (1980)
	Individual/system interface		
	Locus of control	Situation/individual	Mott (1972)
	Member needs	Cognitive/competence	Lorsch & Morse (1974)
	Cognitive style	Intuition-thinking	Mitroff & Kilmann (1976)
	Conflict	Systems conflict	Pondy (1967)

formally designed open-technical system. Together, both the open-technical and the closed-social systems constitute the formal and informal route to system-wide integration in the organization.

The criteria of effectiveness for the open-technical system can be described as the efficient acquisition of resources and the efficient distribution of products and services. Basically, once the organization's strategy and system goals are set (for the moment), the organization must provide the relevant inputs to the production process (technical core) and be able to distribute the outputs—so the technical core can go about its goal of steady-state efficiency. Ansoff and Brandenburg (1971) refer to this as structural responsiveness (at the boundaries of the organization), while Yuchtman and Seashore (1967) outline a “system resource” approach to organization effectiveness. Kilmann and Herden (1976) define the term external efficiency (as in open-technical) to refer to the efficient transfer of technical and informational resources between the organization and its environment, emphasizing that the organization is very dependent on its environment for such exchanges. For example, decisions on plant location, pricing, purchasing, market representation, and labor markets (as a factor in production) require accurate and timely environmental information.

The given or situation of the open-technical system entails an environment that is not as unpredictable and uncertain as the turbulent field but is not as stable and certain as the buffered-technical core, as in placid-randomized. Rather, the environment consists of patterns, changing relationships, economic trends, extrapolated developments, and the like. Emery and Trist (1965) refer to this situation as placid, clustered, and disturbed reactive, the latter including other organizations' behaviors that compete with the focal organization. If the organization were strictly a closed system where inputs and outputs were transferred automatically across the system's boundaries, there would be no need for external-efficiency criteria. The open-technical system explicitly recognizes this gap between sociopolitical strategy and productivity, and makes use of its own technologies, structures, controls, goals, and so on, to manage this interface.

The technology that can be employed to address patterned, changing relationships between the organization and the environment has been referred to as “engineering” by Perrow (1967). By this term Perrow means that the problem facing the organization tends to be well-structured (has analyzable search procedures), although it has high variability with many exceptions on a day-to-day basis. An engineering-type *problem* is what Perrow seems to be emphasizing and therefore a more generic term for this technology might be “problem-solving.” The latter would include the systematic use of any scientific discipline to solve a recurring (patterned)

problem even if the pattern presents itself in many different ways and in many different forms. Inventory problems, product forecasting problems, manpower planning problems, capital investment problems, market distribution problems, pricing problems, and so on, would be approached most efficiently by a discipline-based, problem-solving "technique."

The structure that would facilitate the efficient acquisition and distribution of resources in a changing but patterned environment, has been defined as the "innovative organization" by Ansoff and Brandenburg (1971). This hybrid form involves a dual arrangement of a technical-core structure with an adaptive structure, much like the matrix organization (Davis & Lawrence, 1977). Project management, product management, multidimensional structures, grid organization, task forces, and committee systems are additional terms that have been used to describe this dual hybrid form of organization structure (Gibson, Ivancevich, & Donnelly, 1973). It should be evident that the dual structure is what allows the organization to manage efficiently the patterned-changing relationships in the environment (as in a product group, a coordinated purchasing effort, a task force on plant relocation, a committee to anticipate competitor actions, or any problem-solving effort that goes beyond the technical core of the organization).

The organizational control that ensures efficient decisions (problem solutions) concerning organization/environment transactions, is the price or market mechanism (Ouchi, 1980). Decisions on labor markets, materials to purchase, warehouse locations, inventory levels, leasing arrangements, contracts with suppliers, and so on, can be guided by the goal of minimizing *costs* according to a number of organizational constraints and objectives. As long as there is a readily established price (cost) for acquiring and distributing the firm's resources (inputs and outputs), members can be evaluated (controlled) by the success they have in efficiently completing these transactions. Where a market is not established, as in the case of various nonprofit organizations or agencies, then some combination of bureaucratic rules and procedures, as well as professional standards and norms, will have to suffice.

The goals of the open-technical system are primarily oriented toward attaining various efficiency criteria regarding the acquisition of valued resources (Yuchtman & Seashore, 1967), maintaining or enhancing organizational slack (Cyert & March, 1963), and improving the problem-solving and decision-making processes for conducting organization/environment transactions. The typical decision-making mode is judgment as supported by instrumental tests of efficiency. (Thompson, (1967). This style of decision-making and evaluation seems most appropriate when there is a high agreement about desired outcomes, but given some amount of uncertainty in the environment, there is dis-

agreement about means and cause/effect relationships. Stated differently, this is a setting where discipline-based problem-solving is congruent with a patterned-changing environment, as guided by market/price/cost assessments. Because of the functional interdependence among subunits (i.e., the goals of one subunit may act as constraints on another) the type of conflict that is generated would be “systems conflict” (Pondy, 1967). Here the focus is on suboptimization of efficiency, as each subunit attempts to maximize its efficiency without due attention to the whole organization and organization-wide goals.

The mediating level, being of intermediate complexity and order, would appear to allow for almost equal influence via individual and situational forces. While the market mechanism dictates criteria and guidelines for decision-making, there is enough ambiguity in the various disciplines (including the necessary interpretations of subjective elements in the environment), to permit individual needs, motives, self-interests, and values to influence problem solutions. In the case where a market mechanism is not available (on the output side of a public agency, for example), the influence of individual preferences and dynamics is expected to be stronger (Downs, 1967). Relevant individual motivations in this mediating level might be cognitive and sense of competence needs (Morse & Lorsch, 1970). Leader behavior would emphasize the attainment of efficiency goals (Bowers & Seashore, 1966), as supported by administrative skills (Katz & Kahn, 1966). Influence would be based heavily on expert power (discipline-based) with an attempt to balance long-term (open system) strategy and short-term (closed system) demands (Thompson, 1967). The job structure of this type of work has been labeled as the “specialist-system unit” by Van de Ven (1976), and the supporting architecture would be flexible work arrangements—congruent with the flexible, macro, innovative organization (Ansoff & Brandenburg, 1971).

Finally, the cognitive style of individuals that would be congruent with problem-solving activity in flexible work groups is defined as “intuition-thinking” (Mitroff & Kilmann, 1976). This cognitive style involves viewing a complex pattern to discern all the logical possibilities for a solution. The thinking style allows technical knowledge and expertise to dominate (vs. the subjective aspects of mental processing), while intuition is best for seeing the key parameters of the problem, even if the situation is unique and seemingly different from previous problems (i.e., analyzable search with many exceptions).

The Closed-Social System

As mentioned earlier, while the open-technical system provides the formal integration of the institutional and technical levels of the organi-

zation, the closed-social system provides the informal, human relations type of integration, largely through group processes, as shown in Table IV. The concern is not with organization/environment relationships and exchanges; rather the emphasis is on interpersonal relationships and issues of loyalty, commitment, motivation, and “*esprit de corps*.”

Criteria of effectiveness for the closed-social system have been defined by Kilmann and Herden (1976) as “internal effectiveness”: attaining the motivation and commitment of particular organizational members to perform specified tasks, as well as the interpersonal relationships that are necessary to facilitate task-related behavior. Mott (1972) includes an adaption criterion in his model of organizational effectiveness. He finds that interpersonal relations and social integration are important in fostering communication in general, and problem-solving in particular. These processes are exemplified in the way organizations anticipate problems and develop satisfactory and timely solutions, and in the promptness and prevalence of the acceptance of solutions by organizational members—as supportive (congruent) with the formal open-technical structures and technologies.

The given situation or environment for the closed-social system is most similar to the placid, randomized description of Emery and Trist (1965), although a better term might be “placid, unique.” The latter, while implying a stable, settled environment (as congruent with a closed system), recognizes that each social setting has its *unique* members, culture (norms), and history. This unique quality requires some special understanding and consideration, in contrast to a randomized environment where happenings are not viewed as unique but as random events that can be approached statistically, for example. Only if the members and culture of an organization were always the same, would it be possible to address the criteria of internal effectiveness in the manner of a standardized, closed-technical system. Since members and cultures *are* unique (with their own special history), the issue of motivation and commitment may be slightly (or significantly) different in every work group and organization.

The technology of the closed-social system is termed “communication networks” (Bavelas, 1950). These networks allow organizational members to communicate with one another: to request information, to provide information, to influence and be influenced on matters of attitudes, beliefs, values, decisions, and actions—including the matter of commitment and adherence to group norms and expectations. Communications can also take place nonverbally or implicitly through attitude and behavior modeling. However, only by preventing members from having any contact with one another could the closed-social system be inactivated. It seems that whenever members are even aware of the presence of others, the social

Table IV. The Closed-Social System

	Organizational variables	Congruent state or quality	Supporting reference
Desired outcome:	Efficiency/effectiveness	Adaption criterion	Mott (1972)
Given:	Environment	Internal effectiveness Placid, "unique"	Kilmann & Herden (1976) Emery & Trist (1965)
Controllable variable:	Macro design	Communication networks	Bavelas (1950)
	Technology	Informal organization	Blau & Scott (1962)
	Structure	Group norms	Cohen (1978)
	Controls		
	Decision process		
	Goals	Group maintenance	Katz & Kahn (1966)
	Decision-making	Group-centered	Vroom & Yetton (1973)
	Evaluation	Internal social tests	Thompson (1967)
	Influence process		
	Authority	Inner circle	Thompson (1967)
	Power	Referent	Katz & Kahn (1966)
	Leadership		
	Style	Join	Tannenbaum & Schmidt (1958)
	Behavior	Facilitating interaction	Bowers & Seashore (1966)
	Skills	Human-relations skills	Mann (1965)
	Micro design		
	Job design	Sociometric	Moreno (1951)
	Architecture	Open floor space	Ullrich & Wieland (1980)
	Individual/system interface		
	Locus of control	Individual/situation	Mott (1972)
	Member needs	Social/belongingness	Maslow (1954)
	Cognitive style	Sensation-feeling	Mitroff & Kilmann (1976)
	Conflict	Interpersonal conflict	Walton (1969)

norms have a strong impact on behavior (Zajonc, 1965). The evolution of communication networks or channels among members, above and beyond the formal lines of authority and communication (Guetzkow & Simon, 1955), as well as social cliques and friendship relationships, constitute the technology by which much influence and information processing take place.

The structure of the closed-social system has been described quite extensively as the "informal organization" (Blau & Scott, 1962). The repeated patterns of interaction and events provides the element of structure (Katz & Kahn, 1966), while the frequency and direction of communication can be shown as a sociometric diagram (Moreno, 1951). The structure changes as new members enter the organization (unlike the formal structure which does not change because of new members replacing others), as the physical space, working hours, and workflow change, or as interpersonal relationships among members are altered over time. Nevertheless, this structure can be documented quite readily and can be shown to correspond very closely to the communication networks (technology) of the informal organization.

The controls for the closed-social system are made up of group norms and the social pressures to adhere to these norms. The literature on small-group dynamics presents an extensive discussion on the process by which members develop a consensus on norms (forming the normative structure of a group) and the pressures to uniformity (as in communications and influence attempts) to ensure that the agreed-upon norms will be followed (Cohen, 1978). Georgopoulos (1957) found that cohesive groups whose norms were supportive of high productivity performed significantly better than cohesive groups whose norms favored low productivity; with noncohesive groups being in-between in actual performance regardless of the direction of their norms. Thus, if the informal organization develops cohesiveness and extensive loyalty among members, it can exert tremendous influence on the attainment of various performance criteria through the groups' control of member attitudes and behavior.

The goals for the informal organization tend to concentrate on the development and maintenance of the groups themselves (Katz & Kahn, 1966). The major stakeholders in decision-making, therefore, would be the group members and employees in general, as in the "inner circle" (Thompson, 1967). The preferred decision-making process would be people-oriented, group-centered, and participative management (Vroom & Yetton, 1973). Tests for evaluating the results of the decision-making would be internal social tests (Thompson, 1967). The leadership style would be join (Tannenbaum & Schmidt, 1958) as in the case of shared leadership; congruent leader behavior would be "facilitation of interaction" (Bowers & Seashore, 1966), as supported by human relations skills (Mann, 1965). The

base of influence would be “referent power” primarily (French & Raven, 1959) and the type of conflict that would emerge from such an informal organization could be labeled as “interpersonal conflict” (Walton, 1969). The architectural design that would encourage such interpersonal and small-group interaction would be an open-floor space allowing for high social density (Ullrich & Wieland, 1980).

The relative balance of person versus situation sources of influence is mixed: the groups are constrained by evolved communication networks and yet individual needs, motives, self-interests, and values can be manifested in the informal group atmosphere. The activated motives would include social and belongingness needs (Maslow, 1954). The cognitive style that is most congruent with the closed-social system is “sensation-feeling” (Mitroff & Kilmann, 1976). A sensitivity to the special qualities and values of each member in the group takes priority over strictly analytical reasoning or logical/technical analysis.

CONCLUSIONS

A look at Tables I-IV reveals the systematic order that is possible when a generic set of underlying dimensions is used to define and sort a great variety of contingency theories across a broad range of organizational functioning. This is certainly not the last word on types, typologies, or even meta- or generic frameworks for sorting a diverse set of concepts—but such a framework is helpful for keeping “the forest separate from the different types of trees.”

If researchers would stick to a more agreed-upon set of labels and types vis-à-vis such a framework, then semantics and jargon would not stand in the way of integration. It would be easier to recognize how the results of one study (on one topic) could benefit the development of another study (on some other topic). Furthermore, using *generic* labels and dimensions of analysis might decrease the proliferation of new names for old concepts, thereby achieving some measure of parsimony.

Directions for Research

One can suggest an almost endless array of research questions that follow from the recurring themes and patterns summarized in this paper. With the limitations of space, only four of these will be suggested—those that are considered to be the most important for further integration and parsimony in the organizational sciences.

First, research questions, hypotheses, methodology, and actual data to test hypotheses, should be stipulated in terms of one or more of the organizational systems. That is, if a study is exploring the relationship between technology and structure, in order to draw upon prior knowledge and impact upon future theories, the study should indicate if the focus is on closed-technical systems, open-social systems, and so on, or some particular combination thereof. A major point of this paper is that it makes quite a difference, depending upon which system is being studied, as to the criteria of effectiveness involved, the type of technology being surveyed, and the structure that would be hypothesized as leading to goal attainment, and so forth. Results that contradict one another may very well be studying different organization systems and would be expected, therefore, to reach different conclusions. Without realizing this, contradictory results would suggest the inadequacy or unreliability of the initial theory, mistakenly.

Second, regarding research methodology, one might expect that the type of methodology employed should be congruent with the type of system under investigation. A closed-technical system, it is hypothesized, is most amenable to the traditional scientific method as represented by the laboratory experiment with various control group designs (Campbell & Stanley, 1963). The nature of the organizational system is deterministic with little "interference" from environmental changes or impacts. On the other hand, researching the open-social system can be approached better with a more organic, flexible methodology, as in a field study, case study, and natural observation (Cook & Campbell, 1979). Allowing for mutual-causal processes that affect, and are affected by, environmental dynamics, is the only way that the qualities of the open system can be captured.

Mitroff and Kilmann (1978) discuss four types of scientists, with their corresponding logic, norms, and conduct of method, that parallel almost exactly the four types of organizational systems presented in this paper. The "analytical scientist," the "general humanist," the "conceptual theorist," and the "particular humanist" correspond to the closed-technical system, the open-social system, the open-technical system, and the closed-social system, respectively. Explicating the linkage between substantive area (*vis-à-vis* type of organizational system) and the appropriate (congruent) scientific methodology is long overdue.

A third issue to consider involves the interrelationship of the four organizational systems. It has been suggested that: (i) the closed-technical system represents the technical core, (ii) the open-social system portrays the institutional level, (iii) the open-technical system provides the formal integration of these two perspectives, and (iv) the closed-social system denotes the informal side of integration in the organization. Some more detailed theory is needed to bring these different systems together.

For example, is it useful to think of an organization as having structural (real) counterparts to these conceptual categories? While one can suggest such parallels (e.g., the production department as the closed-technical system, strategic planning staffs as the open-social systems, etc.), the linkages are not so clear-cut. Strategic planning can be done as a collateral organization (Zand, 1974) where members from parts of the formal organization, from technical core to high-level staff groups, participate in formulating organizational goals and strategy (Mitroff, Kilmann, & Barabba, 1977). The closed-social system, as the informal organization, can involve networks of interaction that stretch throughout the formal organization. Likewise, the open-technical system can include a great variety of boundary positions in the organization: purchasing, sales, legal counsel, public relations, personnel-human resources, financial planning, and so on. The interrelationships among all four organizational systems, therefore, may be more complicated than it first appears.

Finally, the fourth direction for research that can be offered concerns theory development of the elements (variables) within each system of organization, *as a function of time*. In essence, the theory that binds effectiveness to environment to structure to technology to controls to goals, and so on, may require change as open and social system dynamics affect the nature of the relationships among these variables. I would expect that the theory of the closed-technical system, for example, is most independent of time since it is closest to a mechanical type arrangement of parts; the environment is largely irrelevant, and the situation, not the individual, dominates behavior. On the other hand, I expect that the theory of the open-social system is most subject to fundamental change as new variables, new problems, new environmental dynamics, and new (changed) people, alter the validity of previous social science knowledge (that once was "valid").

If there is an ultimate, *absolute* theory, this will occur for the closed-technical system. If there is a changing, *relativistic* theory, this will occur for the open-social system. I anticipate that the open-technical and the closed-social systems will have both absolute and relativistic theories, simply because of the open perspective in the one case and the people dynamic in the other. One may conclude that even the crusade for absolute theories and truth (i.e., logical positivism) in contrast to the growing belief that everything in social phenomena is relative and dynamic (i.e., existential-phenomenology), can be put in the proper perspective with a metatypology. It now seems that these fundamental, philosophical differences are both right depending upon the organizational system in question — the epitome of contingency theory!

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