



Organizational Diagnostic Models: A Review & Synthesis

White Paper

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Introduction

The purpose of this review is to examine several organizational diagnostic models which have been conceptualized in the research literature, including the Burke-Litwin Model of Organizational Performance and Change. In order to understand these models, a brief explanation of organizational diagnosis is warranted. Lastly, causal modeling procedures such as path analysis and structural equations modeling are examined in this review as techniques for assessing the validity of organizational models.

The Notion of Organizational Diagnosis

Many organization development (OD) strategies exist for improving an organization's effectiveness (Beer & Spector, 1993; Cummings & Worley, 1993; Rothwell & Sredl, 1992). One of these strategies, organizational diagnosis, involves "diagnosing," or assessing, an organization's current level of functioning in order to design appropriate change interventions. The concept of diagnosis in organization development is used in a manner similar to the medical model. For example, the physician conducts tests, collects vital information on the human system, and evaluates this information to prescribe a course of treatment. Likewise, the organizational diagnostician uses specialized procedures to collect vital information about the organization, to analyze this information, and to design appropriate organizational interventions (Tichy, Hornstein, & Nisberg, 1977).

Like the physician, the organizational diagnostician views the organization as a total system. In the field of medicine, this is considered to be holistic medicine, while in the field of organization development, the total system view is considered to represent *open systems theory* (Katz & Kahn, 1978). That is, an organization can be viewed as a total system with inputs, throughputs, and outputs, connected by feedback loops. The feedback loops illustrate the idea that systems are affected by outputs (e.g., products and services), as well as its inputs. The open systems view will be explained further in a later section of this review.

Like the patient visiting the physician, the process of collecting data during organizational diagnosis can serve to motivate organizational members to learn about and participate in the change process (or the intervention in the medical scenario). The diagnosis, either medical or organizational, usually confirms that a problem actually exists. Within an organization, the diagnostic process often facilitates an admission by top management that the organization does indeed have problems or needs that should be addressed (Argyris, 1970; Harrison, 1987; Manzini, 1988). Further, a variety of data collection techniques and/or procedures are often used to rule out presenting problems and to search for the underlying problems (Fordyce & Weil, 1983; Kolb & Frohman, 1970; Porras & Berg, 1978). Finally, within the organizational diagnostic process, the results of the data collection are fed back to organizational members within the organization in order to begin the process of organizational change (Burke, Coruzzi, & Church in Kraut, 1996; French & Bell, 1995; Harrison, 1987).

In viewing organizations as systems, organizational diagnosticians direct their attention to those activities and processes within the system that are considered to be vital to organizational life. However, the scope of a diagnosis may be either narrow and symptomatic or broad and systematic. For example, a narrow and symptomatic diagnosis involves a very quick scan of the organization, focusing on trouble spots (Tichy, 1983). The problem with this type of diagnosis is that, all too often, the problem keeps reoccurring. Therefore, it is important to systematically examine the entire system when conducting organizational diagnosis, rather than focusing on rapid diagnoses and “quick fixes” (French & Bell, 1995). The use of organizational models, to be discussed in the next section, facilitates the systematic diagnosis of organizations.

Uses of Organizational Models

An organizational model is a representation of an organization that helps us to understand more clearly and quickly what we are observing in organizations. Burke explains the many ways in which organizational models are useful (in Howard and Associates, 1994):

1. Models help to enhance our understanding of organizational behavior.
2. Models help to categorize data about an organization.
3. Models help to interpret data about an organization.
4. Models help to provide a common, short-hand language.

The model provides a systematic way to collect data on the organization and to understand and categorize the data. Models often identify vital organizational variables which are hypothesized to exist based on prior research. Models also depict the nature of the relationships between these key variables (e.g, one organizational variable impacts another). Without a model to guide the collection of data and to interpret the data, a diagnostician must instead collect data based on hunches and analyze it for themes. While many practitioners have intuitive models in their minds, an explicit model greatly aids the diagnostic process, given the complexity of organizations and the massive amount of information available for analysis.

Burke does warn organizational diagnosticians about rigidly adhering to one model, despite evidence that the model may be appropriate for the organization (in Howard, 1994). He suggests that is possible to become trapped by one’s chosen model. For example, if “one particular viewpoint drives the diagnostic process, a consultant can easily miss important issues in the organization” (pp. 55-56). In other words, the organizational diagnostician may frame the data collection procedures based on the limited variables in the model, thereby failing to collect important information on other possible variables.

Descriptions of Organizational Diagnostic Models

The models are presented in the chronological order in which they first appeared in the literature. The models reviewed in this section include:

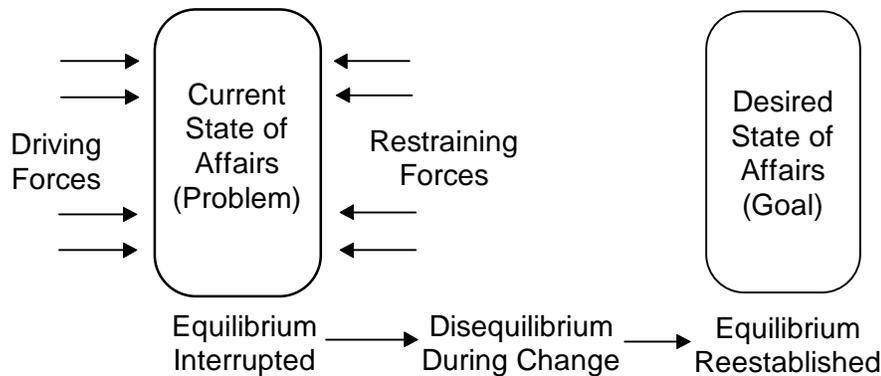
1. Force Field Analysis (1951)
2. Leavitt's Model (1965)
3. Likert System Analysis (1967)
4. Open Systems Theory (1966)
5. Weisbord's Six-Box Model (1976)
6. Congruence Model for Organization Analysis (1977)
7. McKinsey 7S Framework (1981-82)
8. Tichy's Technical Political Cultural (TPC) Framework (1983)
9. High-Performance Programming (1984)
10. Diagnosing Individual and Group Behavior (1987)
11. The Burke-Litwin Model of Organizational Performance & Change

Force Field Analysis

In 1951, Kurt Lewin developed a model for analyzing and managing organizational problems which he has termed Force Field Analysis (French & Bell, 1995; Fuqua & Kurpius, 1993; Lewin, 1951). This model is relatively simple to understand and easy to visualize. A depiction of the model (see Figure 1) identifies both driving forces and restraining forces within an organization. These driving forces, such as environmental factors, push for change within the organization while the restraining forces, such as organizational factors (e.g., limited resources or poor morale), act as barriers to change. To understand the problem within the organization, the driving forces and restraining forces are first identified and, hence, defined. Goals and strategies for moving the equilibrium of the organization toward the desired direction can then be planned.

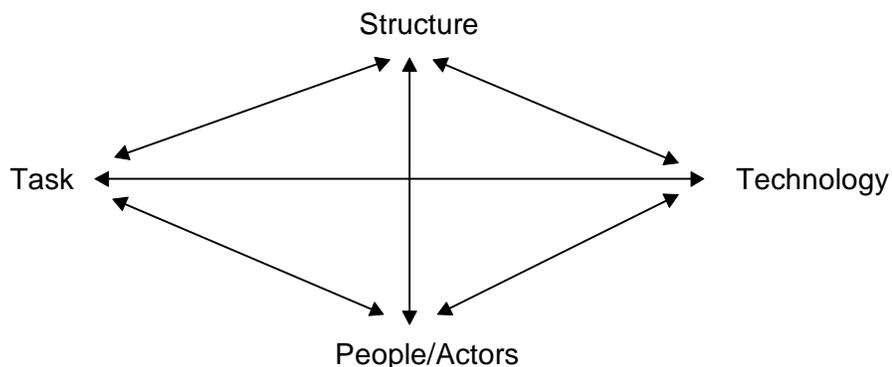
The model relies upon the change process, with the social implications built into the model (e.g., disequilibrium is expected to occur until equilibrium is reestablished). The general goal of this model is to intentionally move to a desirable state of equilibrium by adding driving forces, where important, and eliminating restraining forces, where appropriate. These changes are thought to occur simultaneously within the dynamic organization.

Figure 1

Force Field Analysis**Leavitt's Model**

Sometime after Lewin conceptualized Force Field Analysis (i.e., fourteen years later, in 1965), Leavitt designed another relatively simple model. This model does specify particular variables within organizations, rather than driving forces; these variables include: task variables, structure variables, technological variables, and human variables (Burke, in Howard, 1994; Leavitt, 1965) (see Figure 2).

Figure 2

Leavitt's Model

The structure variable refers to the authority systems, communication systems, and work flow within the organization. The technological variable includes all the equipment and machinery required for the task variable; the task variable refers to all the tasks and subtasks involved in providing products and services. Finally, the human variable, refers to those who carry out the tasks associated with organizational goals (i.e., products and services). The diamond shaped arrows in the model emphasize the interdependence among the four variables.

Leavitt has postulated that a change in one variable will affect the other variables. For example, with a planned change in one variable (e.g., the introduction of advanced technology), one or

more variables will be impacted. Such interventions are typically designed to affect the task variable (e.g., to affect positive changes in products or services). In this example, the other variables would also likely change, as morale (i.e., people) might increase and communication (i.e., structure) might be improved due to the new technology.

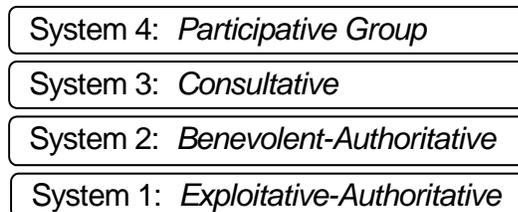
Although Leavitt describes the variables within his model as dynamic and interdependent, the model is too simple to make any direct causal statements regarding the four variables. Similar to the Force Field Analysis model, Leavitt suggests that a change in one variable may result in compensatory or retaliatory change in the other variables; this notion is similar to the opposing forces in Lewin's model. However, unlike Force Field Analysis, Leavitt does not address the role of the external environment in bringing about change in any of the variables.

Likert System Analysis

The organizational dimensions Likert addresses in his framework include motivation, communication, interaction, decision making, goal setting, control, and performance (Likert, 1967). While Likert did not use an illustration to depict his framework, like the earlier models reviewed, he describes four different types of management systems within organizations, which take into account the organizational dimensions he identifies (see Figure 3).

Figure 3

Likert's Framework



In order to determine the management system operating in any given organization, Likert developed a 43-item survey instrument with questions related to the seven organizational dimensions. The purpose of the instrument was to measure employees' perceptions (upper management, supervisors, and staff) of the organizational dimensions within the organization. For example, one of the questions assessing communication is as follows in Figure 4.

Figure 4
Item Example from Likert's Instrument

<i>Extent to which supervisors willingly share information with subordinates:</i>	Provides minimum information	Gives subordinates only information superior feels they need	Gives information needed and answers most questions	Seeks to give subordinates all relevant information and all information they want

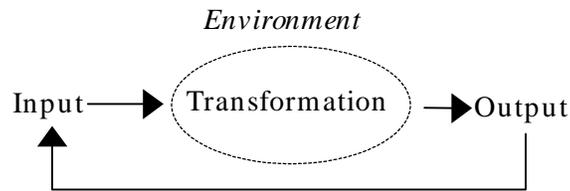
Notice that Likert's original scale did not have standardized scale labels such as "strongly agree," "agree," "neither agree nor disagree," "disagree," and "strongly disagree." Instead, Likert provided customized scale labels for each question stem (i.e., for all 43 items). The first response alternative, in this case "provides minimum information," represents Likert's System 1: Exploitative-Authoritative. The second response alternative, "gives subordinates only information superior feels they need," represents System 2: Benevolent-Authoritative, and so forth. To determine the perceived functioning of the organization, the responses of various employee groups are averaged across items and dimensions. A profile is graphically plotted, indicating the current management system level for each of Likert's seven dimensions.

The terminology and system devised by Likert have been adapted and/or changed by other researchers over the years. For example, Nelson and Burns (1984) have introduced a version of Likert's framework with the following terminology: the reactive organization (System 1), the responsive organization (System 2), the proactive organization (System 3), and the high-performing organization (System 4). Similarly, Baker (1996) refers to System 1 as "Coercive," System 2 as "Competitive," System 3 as "Consultative" (the same as Likert), and System 4 as "Collaborative." These changes have been made to reflect more modern terminology and contemporary theory. Nelson and Burn's High-Performance Programming framework will be discussed in greater detail in a subsequent section of this review.

Open Systems Theory

Many of the organizational diagnostic models to be discussed rely upon the abstract notion of open systems theory as a basic assumption, thus, warranting a brief discussion of open systems theory. The premise of the theory is that organizations are social systems which are dependent upon the environment in which they exist for inputs (Katz & Kahn, 1978). Open systems theory allows for repeated cycles of input, transformation (i.e., throughputs), output, and renewed input within organizations. A feedback loop connects organizational outputs with renewed inputs (see Figure 5).

Figure 5

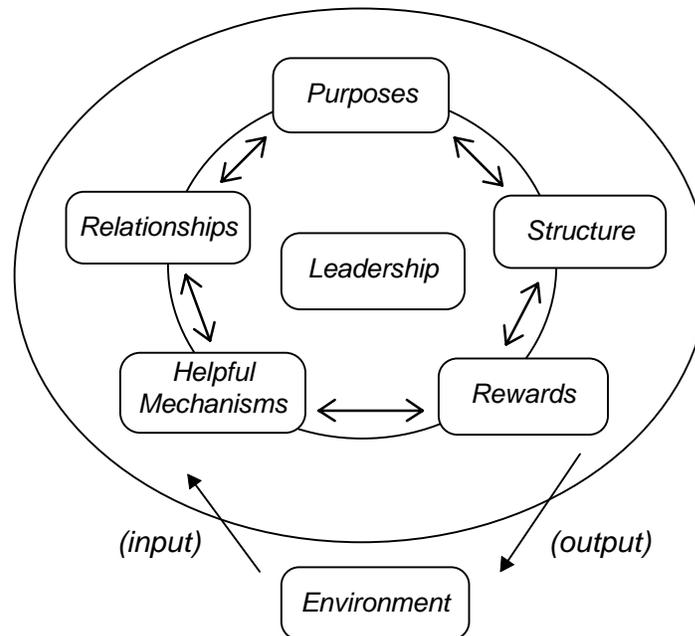
Open Systems Theory

Traditional organizational theories have viewed organizations as “closed” systems which are independent of the environment in which they exist (Katz & Kahn, 1978). In the organizational models reviewed in this paper thus far, there is an overemphasis on variables within the organization and an absence of any feedback from the environment.

Weisbord’s Six-Box Model

Weisbord (1976) proposes six broad categories in his model of organizational life, including purposes, structures, relationships, leadership, rewards, and helpful mechanisms. The purposes of an organization are the organization’s mission and goals. Weisbord refers to structure as the way in which the organization is organized; this may be by function – where specialists work together – or by product, program, or project – where multi-skilled teams work together. The ways in which people and units interact is termed relationships. Also included in the box of relationships is the way in which people interact with technology in their work. Rewards are the intrinsic and extrinsic rewards people associate with their work. The leadership box refers to typical leadership tasks, including the balance between the other boxes. Finally, the helping mechanisms are the planning, controlling, budgeting, and information systems that serve to meet organizational goals. The external environment is also depicted in Weisbord’s model, although it is not represented as a “box” (see Figure 6).

Figure 6

Conceptualization of Weisbord's Six-Box Model

Weisbord identifies as inputs the money, people, ideas, and machinery which are used to fulfill the organization's mission. The outputs are products and services.

Two premises which are not apparent in Weisbord's model are crucial to understanding the boxes in the model. The first premise refers to formal versus informal systems. Formal systems are those policies and procedures the organization claims to do. In contrast, informal systems are those behaviors which actually occur. The bigger the gap between the formal and informal systems within the organization, the less effective the organization is. The second premise concerns the fit between the organization and the environment, that is, the discrepancy between the existing organization and the way the organization should function to meet external demands. Weisbord defines external demands or pressures as customers, government, and unions.

Weisbord poses diagnostic questions for each box of his model. For example, he suggests that OD consultants determine whether organizational members agree with and support the organization's mission and goals within the purposes box. This question refers to his premise regarding the nature of the formal and informal systems within the organization. A sample of some of the questions he poses are as follows:

- *Purposes*: Do organizational members agree with and support the organization's mission and goals?
- *Structure*: Is there a fit between the purpose and the internal structure of the organization?

- *Relationships*: What type of relations exist between individuals, between departments, and between individuals and the nature of their jobs? Is their interdependence? What is the quality of relations? What are the modes of conflict?
- *Rewards*: What does the organization formally reward, and for what do organizational members feel they are rewarded and punished? What does the organization need to do to fit with the environment?
- *Leadership*: Do leaders define purposes? Do they embody purposes in their programs? What is the normative style of leadership?
- *Helpful Mechanisms*: Do these mechanisms help or hinder the accomplishment of organizational objectives?

In summary, Weisbord's model focuses on internal issues within an organization primarily by posing "diagnostic questions" which have to do with the fit between "what is" and "what should be." The questions he poses are not predicted by the model; rather, they appear to be based on his OD practice. These questions serve to convolute the model because they do not flow from the logic of the model. Moreover, Weisbord omits many interconnections between the boxes of the model. Finally, Weisbord only tangentially addresses the impact of the external environment in the model.

The Congruence Model for Organization Analysis

The Nadler-Tushman Congruence Model is a more comprehensive model, specifying inputs, throughputs, and outputs, which is consistent with open systems theory (Katz & Kahn, 1978). This model is very similar to Leavitt's model; it also retains the formal and informal systems of the Weisbord six-box model. The model is based on several assumptions which are common to modern organizational diagnostic models; these assumptions are as follows:

1. Organizations are open social systems within a larger environment.
2. Organizations are dynamic entities (i.e., change is possible and occurs).
3. Organizational behavior occurs at the individual, the group, and the systems level.
4. Interactions occur between the individual, group, and systems levels of organizational behavior.

These assumptions have been used in some of the previous models examined, although only implicitly.

The inputs within the Nadler-Tushman Congruence model include such factors as the environment, resources, history (i.e., patterns of past behavior), and organizational strategies (see Table A). Nadler and Tushman are explicit in their conceptualization of each of the factors. For example, they describe the resources available to the organization as human resources,

technology, capital, information, and other less tangible resources. While strategy is an input in the model, it is the single most important input to the organization and is depicted by the arrow from the input box to the organization.

The system components of the whole organizational transformation process are informal organizational arrangements, task, formal organizational arrangements, and individual components (see Table A and Figure 7). Similarly, the outputs of the model include individual, group, and system outputs: products and services, performance, and effectiveness. While outputs such as products and services are generally understood, specific examples of organizational performance and effectiveness identified by Nadler and Tushman (1980) are provided in the previous table.

Figure 7

Components of the Congruence Model

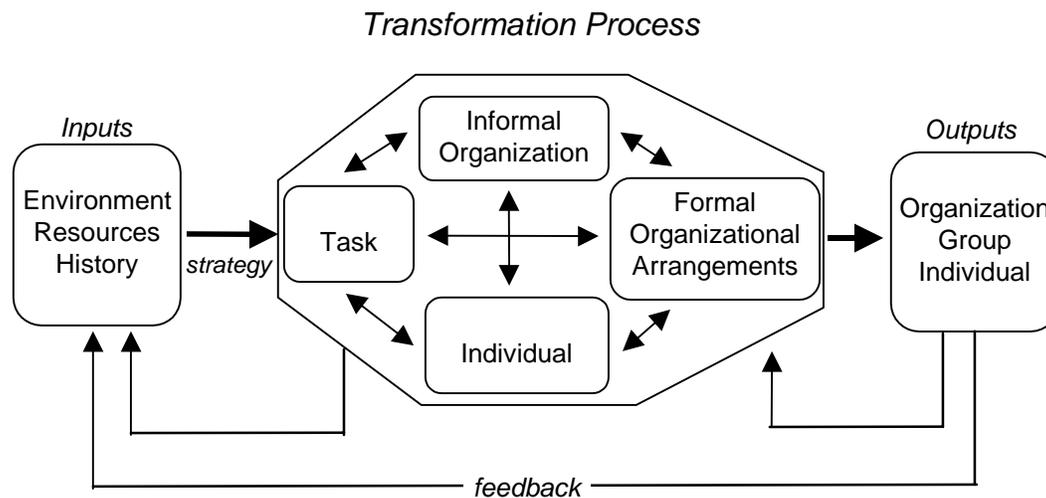


Table A

Inputs, System Components, and Outputs of the Congruence Model

Inputs			
<i>Environment</i>	<i>Resources</i>	<i>History</i>	<i>Strategy</i>
All factors, including institutions, groups, individuals, events, and so on, that are outside the organization being analyzed, but that have a potential impact on that organization	Various assets to which the organization has access, including human resources, capital, information, and so on, as well as less tangible resources (recognition in the market, and so forth)	The patterns of past behavior, activity, and effectiveness that may affect current organizational functioning	The stream of decisions about how organizational resources will be configured to meet demands, constraints, and opportunities within the context of the organization's history
System Components (i.e., throughputs)			
<i>Task</i>	<i>Individual</i>	<i>Formal Org. Arrangements</i>	<i>Informal Organization</i>
The basic and inherent work to be done by the organization and its parts	The characteristics of individuals in the organization	The various structures, processes, methods, and so on that are formally created to get individuals to perform tasks	The emerging arrangements, including structures, processes, relationships, and so forth
Outputs (e.g., performance and effectiveness)			
<i>Individual behavior and affect</i>	<i>Group and Intergroup Behavior</i>	<i>System Functioning (i.e., organizational)</i>	
Absenteeism, lateness, turnover, levels of satisfaction, drug usage, and off-the-job activities which impact performance	Intergroup conflict, collaboration, and quality of intergroup communication	Attainment of desired goals of production, return on investment, etc.; utilization of available resources; adaptability to external environmental demands	

Note. Nadler & Tushman, 1980

Nadler and Tushman (1980) apply the concept of congruence to their model. They describe congruence, or fit, as “the degree to which the needs, demands, goals, objectives, and/or structures of one component are consistent with the needs, demands, goals, objectives, and/or structures of another component” (i.e., how well pairs of components fit together). For example, a task demands a level of skill and knowledge and likewise, the individuals available to perform the task possess varying levels of skill and knowledge. Nadler and Tushman (1980) explain that the greater the skill and knowledge match between the task and the individual, the more effective the performance will be.

The model is termed the congruence model based on the fit between the system components (informal organization, task, formal organizational arrangements, and individual). Six paired comparisons within the system are possible based on the four components. Nadler and Tushman (1980) raise issues for consideration for each of these paired comparisons (see Table B).

Through analysis of the congruence between the system parts, the whole organization is diagnosed as displaying a relatively high or low total system congruence. The link between the “paired fits” and the system outputs must also be considered. Nadler and Tushman (1980) explain, “fits, or lack of fits, between the key components have consequences in terms of system behavior.” For example, the fits and lack of fits can be related to behaviors observed in the system such as conflict, performance, and stress.

Table B

Definitions of Congruence in the Congruence Model

<i>Definitions of Congruence</i>	
<i>Paired Fit</i>	<i>Issues</i>
Individual - Formal Organizational Arrangements	How are individual needs met by the organizational arrangements? Do individuals hold clear or distorted perceptions of organizational structures? Is there a convergence of individual and organizational goals?
Individual - Task	How are individual needs met by the tasks? Do individuals have skills and abilities to meet task demands?
Individual - Informal Organization	How are individual needs met by the informal organization? How does the informal organization make use of individual resources consistent with informal goals?
Task - Formal Organizational Arrangements	Are organizational arrangements adequate to meet the demands of the task? Do organizational arrangements motivate behavior that is consistent with demands?
Task - Informal Organization	Does the informal organization structure facilitate task performance or not? Does it hinder or help meet the demands of the task?
Formal Organizational Arrangements - Informal Organization	Are the goals, rewards, and structures of the informal organization consistent with those of the formal organization?

Note. Nadler & Tushman, 1980

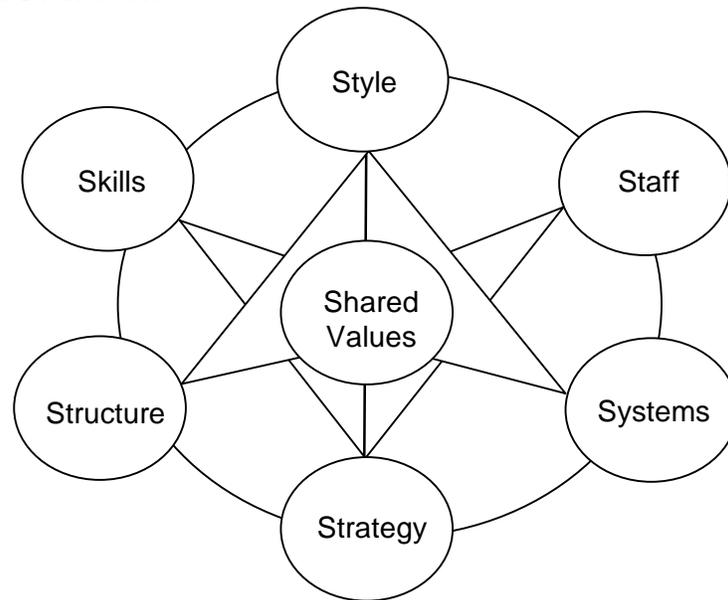
McKinsey 7S Framework

The McKinsey 7S Framework was named after a consulting company, McKinsey and Company, which has conducted applied research in business and industry (Pascale & Athos, 1981; Peters & Waterman, 1982). The authors all worked as consultants at McKinsey and Company; in the 1980's, they used the model in over seventy large organizations. The McKinsey 7S Framework

was created as a recognizable and easily remembered model in business. The seven variables, which the authors term “levers,” all begin with the letter “S” (see Figure 8).

Figure 8

Illustration of the 7S Framework



The shape of the model was also designed to illustrate the interdependency of the variables; the illustration of the model has been termed the “Managerial Molecule.” While the authors thought that other variables existed within complex organizations, the variables represented in the model were considered to be of crucial importance to managers and practitioners.

The seven variables include structure, strategy, systems, skills, style, staff, and shared values. Structure is defined as the skeleton of the organization or the organizational chart. The authors describes strategy as the plan or course of action in allocating resources to achieve identified goals over time. The systems are the routinized processes and procedures followed within the organization. Staff are described in terms of personnel categories within the organization (e.g., engineers), whereas the skills variable refers to the capabilities of the staff within the organization as a whole. The way in which key managers behave in achieving organizational goals is considered to be the style variable; this variable is thought to encompass the cultural style of the organization. The shared values variable, originally termed superordinate goals, refers to the significant meanings or guiding concepts that organizational members share.

The authors have concluded that American companies tend to focus on those variables which they feel they can change (e.g., structure, strategy, and systems) while neglecting the other variables. These other variables (e.g., skills, style, staff, and shared values) are considered to be “soft” variables. Japanese and a few excellent American companies are reportedly successful at linking their structure, strategy, and systems with the soft variables. The authors have concluded that a company can not merely change one or two variables to change the whole organization.

For long-term benefit, they feel that the variables should be changed to become more congruent as a system.

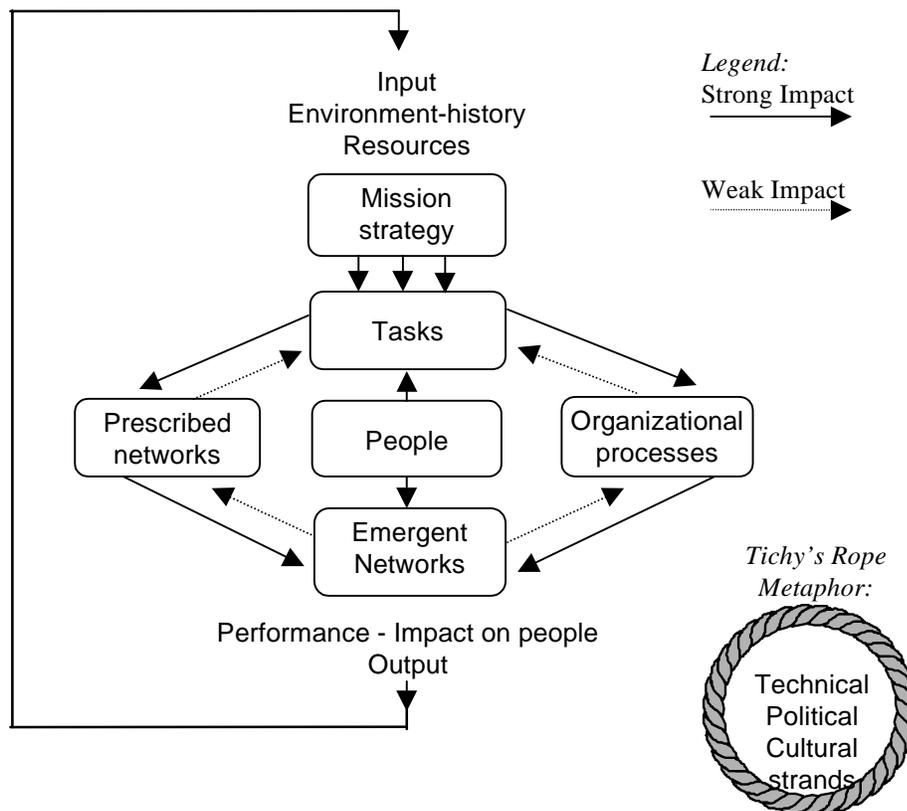
The external environment is not mentioned in the McKinsey 7S Framework, although the authors do acknowledge that other variables exist and that they depict only the most crucial variables in the model. While alluded to in their discussion of the model, the notion of performance or effectiveness is not made explicit in the model.

Tichy's Technical Political Cultural (TPC) Framework

Similar to some of the previous models, Tichy's model includes inputs, throughputs, and outputs, which is consistent with the open systems perspective discussed earlier. Tichy identifies key variables in the model which are important to the change management process (Tichy, 1983). The environment and history (broadly construed) are two major categories of input to the organization whereas resources are a third category of input. The throughput variables, or change levers, identified in the model include mission/strategy, tasks, prescribed networks, people, organizational processes, and emergent networks (see Figure 9).

Figure 9

The Technical, Political, Cultural Framework



Tichy defines the mission/strategy variable as the organization's approach to carrying out its mission and strategy and criteria for effectiveness (i.e., the organization's purpose). The tasks variable refers to the technology by which the organization's work is accomplished. The prescribed networks (i.e., the formal organization) have to do with the designed social structure of the organization, such as the organization of departments and the communication and authority networks. The people variable refers to the characteristics of organizational members, including their background, motivation, and managerial style. The mechanisms which enable the formal organization to carry out the work are termed the organizational processes; these include organizational communication, decision-making, conflict management, control, and reward systems. The final throughput variable, emergent networks, refers to the structures and processes in the organization which emerge informally.

The focal point of Tichy's model is the output variable, which he terms organizational effectiveness. Of course, the output is dependent upon the input and throughput variables. All of the variables, including the input and output categories, are considered to be interrelated in the model. While some variables have a strong impact on other variables, other variables have a weaker, or reciprocal, relationship on other variables (as denoted by the straight and dashed lines).

In considering the variables in the model, Tichy applies an overlay which is vital to his theorizing. This overlay concerns the technical, political, and cultural dynamics going on within the variables of the model (abbreviated as TPC). The TPC overlay raises four questions which are vital to organizational diagnosis. These questions address the technical, political, and cultural dynamics of the organization. These questions follow:

1. How well are the parts of the organization aligned with each other for solving the organization's technical problems?
2. How well are the parts of the organization aligned with each other for solving the organization's political problems?
3. How well are the parts of the organization aligned with each other for solving the organization's cultural problems?
4. How well aligned are the three subsystems of the organization, the technical, political, and cultural?

The technical dynamics are those aspects of the organization which are knowable, such as production processes or available resources. The political dynamics are the views of dominant groups, including bargaining by powerful organizational groups. The cultural dynamics constitute the shared symbols and values which make up the organizational culture. As depicted in the illustration of the model, Tichy uses a rope metaphor to emphasize the strategic importance of the three strands (*technical*, *political*, and *cultural*) in the change process. The three strands must be managed together, or realigned, for effective change.

According to Tichy's model, organizational diagnosis is quite complex. An OD consultant would begin by collecting data relevant to the four questions for each variable represented in the model. The data may be collected by document analysis, interviews, questionnaires, and interviews. In

Table C

Nelson and Burns' High-Performance Programming

<p><i>The High-Performing Organization</i></p> <p><i>Level 4</i></p>	<p>Leaders in the high-performing organization are fully invested in empowering organizational members. There is a common focus on organizational excellence. Communication throughout the organization is relatively unrestrictive. The organization is in a constant state of evolution guided by a common vision. Organizational members prize highly their identity with the organization, and opportunities for self actualization are substantial.</p>
<p><i>The Proactive Organization</i></p> <p><i>Level 3</i></p>	<p>The proactive organization focuses on the future. Leadership has become focused on developing purpose for the organization. Members focus on the quality of their contribution to organizational successes. The organization is actively involved in planning and development strategies.</p>
<p><i>The Responsive Organization</i></p> <p><i>Level 2</i></p>	<p>The responsive organization is more functional, having achieved some clarity of purpose and goals. The organization has some capability to adapt to changing environmental circumstances. Leaders actively coach members in the direction of organizational goals, and some cohesion has developed among work teams.</p>
<p><i>The Reactive Organization</i></p> <p><i>Level 1</i></p>	<p>The reactive organization is one badly in need of renewal. The organization lacks shared focus, and management is preoccupied with assigning blame for poor outcomes. Members spend a disproportionate amount of time avoiding aversive consequences, and leaders spend much of their time enforcing policies that often lack relevance to any common purpose.</p>

Note. Nelson & Burns, 1984

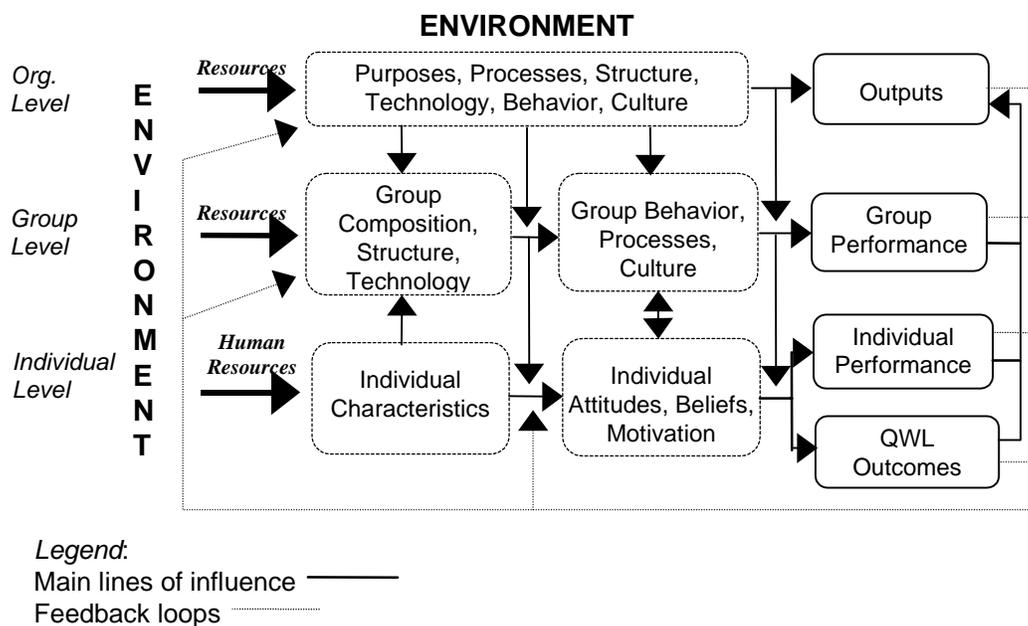
The leadership activities associated with the four levels of performance in the high-performance programming framework are as follows: the high-performing organization is associated with “empowering” leadership, the proactive organization is associated with “purposing” leadership, the responsive organization is associated with “coaching” leadership, and the reactive organization is associated with “enforcing” leadership. To clarify, “purposing” leadership activity refers to leadership behavior which maintains an integrated, focused purpose for the organization. The authors describe these leadership behaviors to emphasize the importance of empowerment and support for individuals’ growth and development within the organization.

Diagnosing Individual and Group Behavior

Harrison (1987) has devised a model for diagnosing individual and group behavior within organizations. This model is somewhat unique in that it focuses on outputs such as organizational performance and quality of work life. The model represents an open systems perspective with minimal boundaries between the organization and external environment. However, the external environment is not represented by anything other than resources and feedback loops, however (see Figure 11).

Figure 11

Harrison's Model for Diagnosing Individual and Group Behavior



The variables accounted for in the model are conceptualized at the organizational, group, and individual levels. The organizational level of performance appears to represent a more abstract level of performance, which is a function of the outputs associated with individual performance, group performance, and quality of work life (QWL) outcomes. Harrison (1987) notes that a divisional level of performance also exists in reality, although he did not include it in the model for the sake of simplicity.

The variables represented in Harrison's (1987) model are those he feels are most important to performance and QWL. The variables which affect individual performance and QWL outcomes are individual characteristics and individual attitudes, beliefs, and motivation (see Table D for descriptions of these variables).

Table D

Individual and Group Levels in Harrison's Model

Key Factors Affecting Performance and Quality of Work Life (QWL)	
<i>Individual Level</i>	
<i>Individual Characteristics</i>	Physical and mental state, social background and traits, training and education, individual needs
<i>Individual Attitudes, Beliefs, Motivation</i>	Motivation, rewards experienced, job felt to be intrinsically rewarding, expectations, equity, trust, specific attitudes (e.g., satisfaction with current procedures, attitudes toward proposed changes)
<i>Group Level</i>	
<i>Group Composition, Structure, and Technology</i>	Social and occupational composition, structure (e.g., nature and extent of rules and work procedures, flexibility, clarity of task assignments, responsibilities), technology (e.g., impact of work procedures and physical arrangements, types of workflow interdependencies)
<i>Group Behavior, Processes, and Culture</i>	Relationships among group members (e.g., cohesiveness, feelings of attachment to group, similarity of views), processes (e.g., communication, cooperation and conflict, decision making, problem solving), supervisory behavior, culture

Note. Harrison, 1987

In contrast, the variables which influence group performance are the group composition, structure, and technology of the organization, and the group behavior, processes, and culture. Notice that these variables are very broad.

The inputs to the model are the resources, including human resources, which are available to the organization and feedback loops from prior organizational outcomes. Since there is no definitive boundary around the organization, it is not clear whether all the resources are derived from the external environment, the organization itself, or a combination of the two. The outputs at the organizational level are the products and services the organization produces. The outcomes associated with group performance within the organization are the solutions, plans, and tactics devised during operations. At the individual level, outcomes include the quality of individual members' work efforts, their initiative, cooperation with others, and commitment to their work; negative outcomes are related to absenteeism and tardiness at the individual level. Lastly, perceptions of job security, working conditions, the meaningfulness and challenge of work, and the degree to which work contributes to the psychological well-being of members are all related to *QWL Outcomes*.

Harrison denotes the lines of influence in the model as either main lines of influence or feedback loops. However, not all of these relationships are reciprocal, as some of the other models have suggested. The extensive number of lines of influence and feedback loops in the model makes it difficult to determine the relationships among variables (i.e., most lines of influence are directional, and only one is bi-directional or reciprocal).

Summary

As is evident from the description of the various models, there are similarities and differences in the ways in which variables are represented in the organizational models. On the one hand, key variables are relatively broad and undefined in some models (e.g., Force Field Analysis model). In other models, the variables represent numerous clearly defined theoretical constructs (e.g., the Congruence Model for Organizational Analysis and Tichy's TPC Framework). Some of the same constructs are represented across models, although they are termed differently. Table E identifies the variables represented in each model as well other characteristics of the models.

Table E: Summary of Reviewed Models

<i>Model</i>	<i>Variables</i>	<i>Variable Interdependency</i>	<i>External environment</i>	<i>Major Premise(s)</i>
Force Field Analysis (1951)	Driving forces, restraining forces	Driving and restraining forces occur simultaneously	Either force may be due to environmental drives or restraints	Disequilibrium occurs during change; equilibrium is re-established
Leavitt's Model (1965)	Task, structure, technological, & human variables	The four variables are interdependent (a change in one affects the others)	Not represented in the model	Change in the variables is undertaken to affect the task variable (products & services)
Likert System Analysis (1967)	Motivation, communication, interaction, decision-making, goal setting, control, performance	The levels of variables are measured independently on a survey	Not directly represented in the model	Four different types of management systems are identified based on the seven variables: participative, consultative, benevolent-authoritative, & exploitative-authoritative

Table E (continued)

Summary of Reviewed Models

<i>Model</i>	<i>Variables</i>	<i>Variable Interdependency</i>	<i>External environment</i>	<i>Major Premise(s)</i>
Weisbord's Six-Box Model (1976)	Purposes, structure, relationships, leadership, rewards, & helpful mechanisms	The interconnections between the boxes, or variables, are not explicit	The environment has an influence through org. inputs and outputs; the fit between the org. and environment is considered also	The larger the gap between the formal and informal systems within each variable, the less effective the org.
Congruence Model for Organization Analysis (1977)	Inputs: environment, resources, history, strategy; throughputs: task, individual, formal org. arrangements, informal org.; outputs: individual, group, and system	Organizations are dynamic; interactions occur at the individual, group, and systems levels across the internal (throughput) variables	The external environment provides feedback related to the inputs and outputs	Assumes: open systems theory, formal and informal systems, the fit or congruence between the internal variables
McKinsey 7S Framework (1981-82)	Style, Staff, Systems, Strategy, Structure, Skills, & Shared Values	Variables are interdependent; the illustration is termed the managerial molecule	Not directly represented in the model, although other non-crucial variables exist	Variables must all change to become congruent as a system

Table E (continued)

Summary of Reviewed Models

<i>Model</i>	<i>Variables</i>	<i>Variable Interdependency</i>	<i>External environment</i>	<i>Major Premise(s)</i>
Tichy's TPC Framework (1983)	Inputs: environment-history, resources; throughputs: mission/strategy, tasks, prescribed networks, people, org. processes, emergent networks; outputs: performance, impact on people	All variables are interrelated, although some relationships are stronger and some are weaker (reciprocal)	The environment is included through org. inputs and outputs and the feedback loop	All variables are analyzed from a technical, political, a cultural perspective (the strategic rope metaphor)
High-Performance Programming (1984)	Time frame, focus, planning, change mode, management, structure, perspective, motivation, development, communication, leadership	The levels of variables are measured independently on a survey	Not directly represented in the model	Four different levels of org. performance are identified based on the eleven variables: high-performing, proactive, responsive, reactive; these are associated with empowering, purposing, coaching, and enforcing leadership behaviors respectively

Table E (continued)

Summary of Reviewed Models

<i>Model</i>	<i>Variables</i>	<i>Variable Interdependency</i>	<i>External environment</i>	<i>Major Premise(s)</i>
Diagnosing Individual and Group Behavior (1987)	Inputs: resources, human resources; throughputs at the org., group, and individual levels (lengthy titles); outputs: group performance, individual performance, QWL outcomes	Main lines of influence and feedback loops; all relationships are directional with the exception of one reciprocal relationship between two variables	Minimal boundaries between the organization and external environment	Assumes: open systems theory; emphasis on three levels of performance, including organizational performance and QWL outcomes

The nature of the relationships between the variables in the various models also differs. For example, some relationships between variables represent direct, one-way impacts while other relationships between variables are considered to be reciprocal (i.e., two-way). One-way (i.e., \rightarrow) or two-way arrows (i.e., \leftrightarrow) are used in models to depict the nature of these relationships. In many of the models, it is not explicit whether variables are merely correlated or whether a cause and effect relationship between variables is thought to exist.

Many of the models rely upon open systems theory as a basic assumption. Additionally, most of the models incorporated the external environment as a factor in organizational functioning. The models do differ in the factors considered vital to organizational functioning or effectiveness (e.g., leadership is considered important in Weisbord's model, whereas the quality of work life is considered most important in Harrison's model).

Most of the models presented in this section of the review are based on OD consultants' experience and practice in working in organizational settings. While an understanding of organizational practice is vital to conceptualizing such models, it is imperative that working models be validated. Without validation through applied research, those using the models to guide their organizational work cannot be sure of the soundness of the model. Therefore, it is essential to consider the empirical foundations (i.e., theoretical underpinnings) of any model used in OD practice, as well as the research available on the validity of the model. Theoreticians welcome the testing and refinement of their models because research serves to increase the knowledge base in OD and organizational behavior. In the next section of this review, a relatively new organizational diagnostic model is examined.

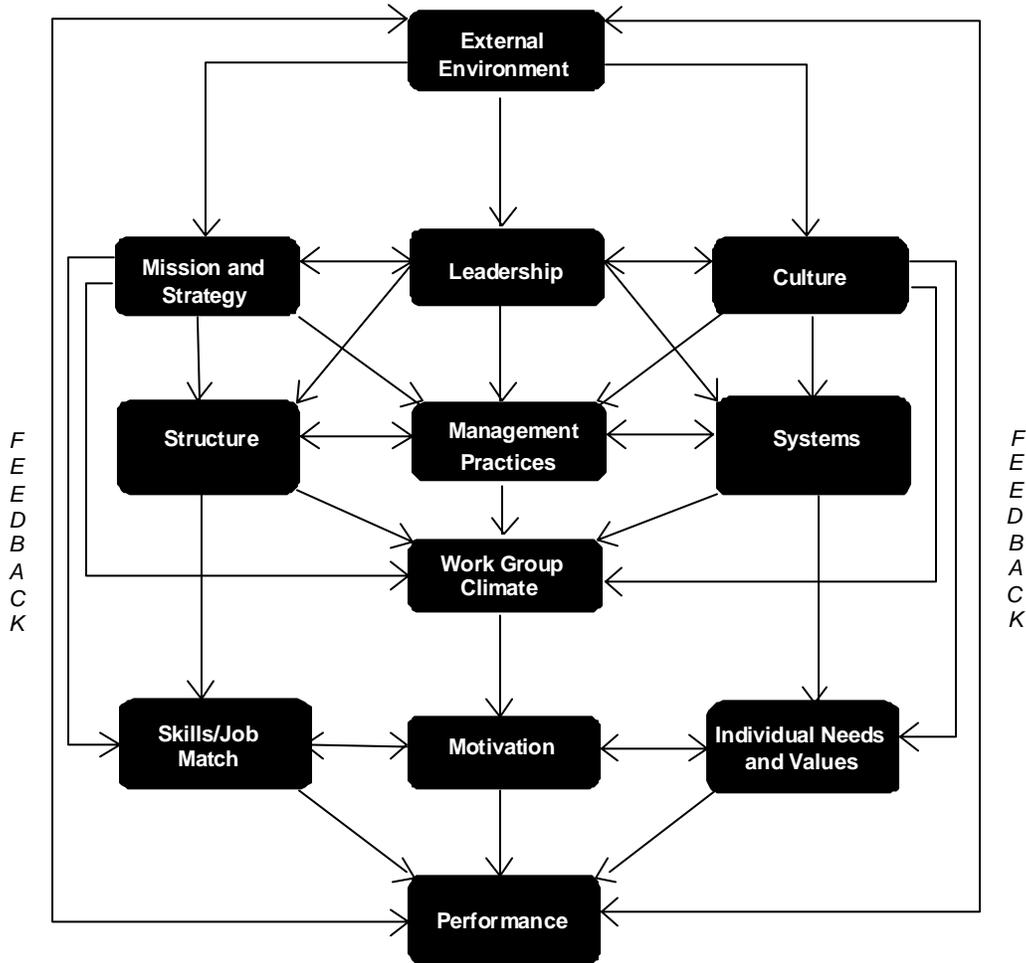
The Burke-Litwin Causal Model

A relatively newer model, the Burke-Litwin Causal Model of Organizational Performance and Change (B-L Model), was developed by Litwin and others (Litwin & Stringer, 1968; Tagiuri & Litwin, 1968) and later refined by Burke in the late 1980's (Burke & Litwin, 1992). This model includes several key features which go beyond the models discussed earlier:

- includes twelve theoretical constructs (i.e., organizational variables)
- distinguishes between the culture and the climate of an organization
- distinguishes between transformational and transactional dynamics
- specifies the nature and direction of influence of organizational variables
- is based on previous models, empirical studies, and OD practice

The twelve organizational variables in the B-L Model are external environment, mission and strategy, leadership, organizational culture, structure, management practices, systems, work unit climate, task requirements and individual skills, motivation, individual needs and values, and individual and organizational performance. With the representation of the external environment as a variable, it is evident that open systems theory underlies the B-L Model. The external environment variable is considered to be the input to the system with the individual and organizational performance variable representing the output (see Figure 12).

Figure 12

The Burke-Litwin Causal Model

The feedback loops on the right and left sides of the model go in both directions. For example, the performance variable affects the external environment through its products and services, and likewise, the individual and organizational performance is affected by demands from the external environment. The remaining variables represent throughputs in open systems theory. Descriptions of all twelve of the variables (i.e., theoretical constructs) in the B-L Model are provided in Table F.

Table F

Organizational Variables in the Burke-Litwin Model

Variable	Conceptualization (i.e., descriptions)
External Environment	Any outside condition or situation that influences the performance of the organization, including marketplaces, world financial conditions, and political/governmental circumstances
Leadership	Executive behavior that provides direction and encourages others to take needed action; includes followers' perceptions of executive practices and values and leaders' role modeling
Mission and Strategy	What top managers believe and have declared as the organization's mission and strategy, as well as what employees believe is the central purpose of the organization; the means by which the organization intends to achieve its purpose over time
Culture	The collection of overt and covert norms, values, and beliefs that guide organizational behavior and that have been strongly influenced by history, customs, and practice
Management Practices	What managers do in the normal course of events with the human and material resources at their disposal to carry out the organization's strategy
Structure	The arrangement of functions and people into specific areas and levels of responsibility, decision-making authority, communication, and relationships to implement the organization's mission and strategy
Systems	Standardized policies and mechanisms that are designed to facilitate work and that primarily manifest themselves in the organization's reward and control systems (e.g., performance appraisal, management information systems, budget development, and human resource allocation)
Climate	The collective current impressions, expectations, and feelings of the members of local work units, which in turn affect members' relations with supervisors, with one another, and with other units

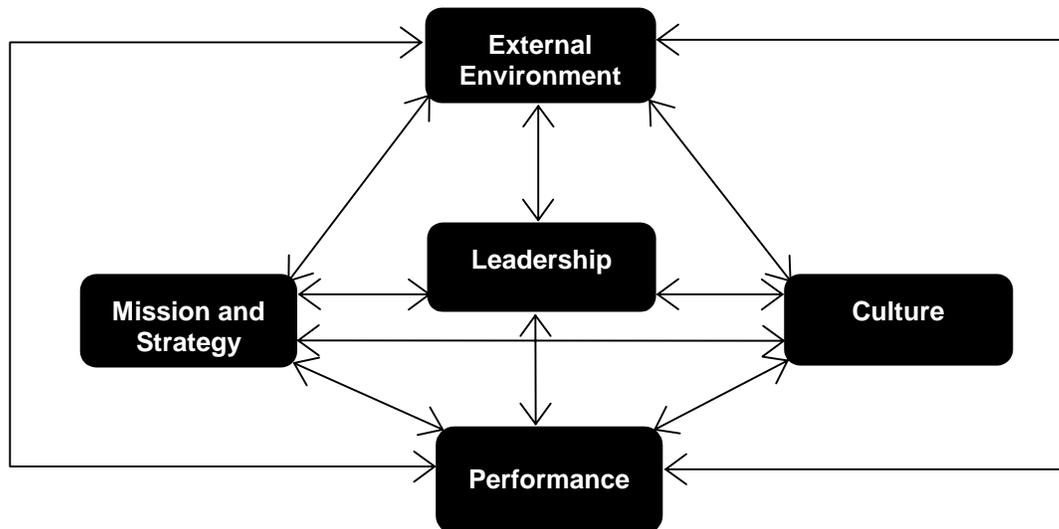
Variable	Conceptualization (i.e., descriptions)
Motivation	Aroused behavioral tendencies to move toward goals, take needed action, and persist until satisfaction is attained (i.e., the energy generated by the combined desires for achievement, power, affection, discovery, and other important human values)
Skills/Job Match	The behavior required for task effectiveness, including specific skills and knowledge required to accomplish work
Individual Needs and Values	The specific psychological factors that provide desire and worth for individual actions or thoughts
Performance	The outcomes or results, with indicators of effort and achievement including productivity, customer or staff satisfaction, profit, and service quality

As is evident through the climate and culture variables, Burke and Litwin make a distinction between organizational climate and culture. Climate is defined as individuals' perceptions of how their work unit is managed and how effectively they and their colleagues work together (see Table K) (Burke & Litwin, 1992). People are much more cognizant of organizational climate than culture (i.e., climate is in the foreground, whereas culture is in the background). In contrast, culture has been defined as the relatively enduring set of values, norms, and beliefs that underlie the social system of the workplace (Burke & Litwin, 1992). These values, norms, and beliefs related to organizational culture are not entirely available to one's consciousness.

In addition to the distinction between culture and climate, the B-L Model distinguishes between transformational and transactional dynamics within organizations. Burke and Litwin's (1992) consideration of transformational and transactional dynamics is rooted in leadership theory and specifically, in the differences between leaders and managers. In the model, transformational change is associated more with leadership, while transactional change is associated more with management. Hence, transformational dynamics represent fundamental changes in behaviors and values that are required for genuine change in organizational culture. In terms of management, transactional dynamics are the everyday interactions and exchanges in work life related to organizational climate (Burke & Litwin, 1992).

The variables in the B-L Model which account for transformational dynamics are depicted in Figure 13; note that this is a truncated version of the model (i.e., the top half of the model with the performance variable).

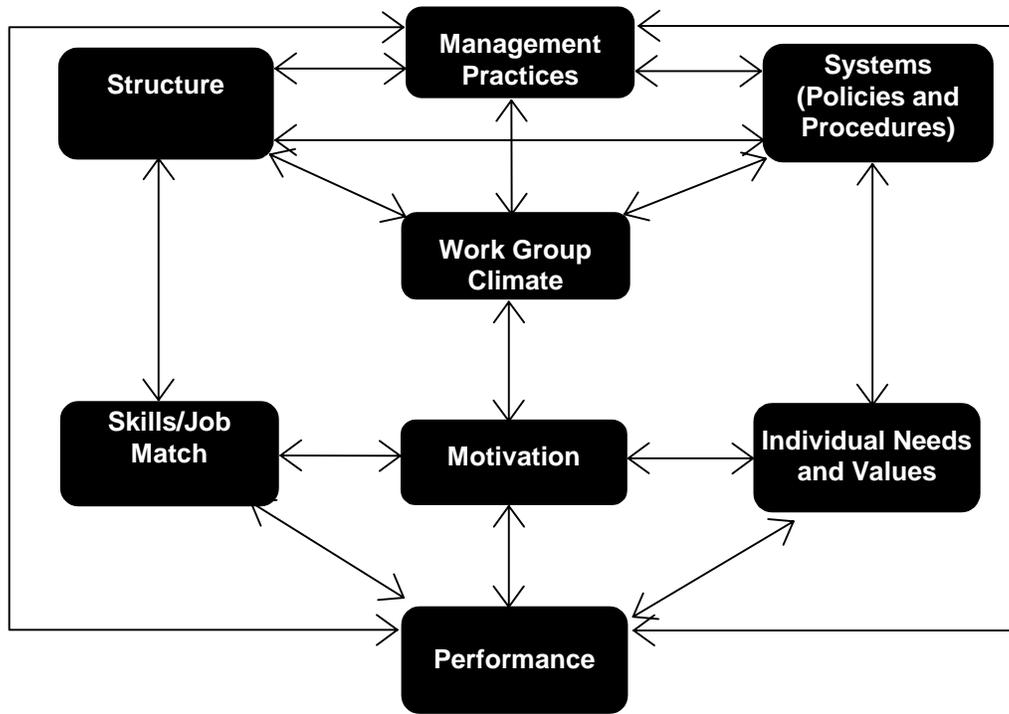
Figure 13

Transformational Variables in the B-L Model

The arrows in the figure above depicts the influence of one variable on another and the directionality of the influence. While the arrows are bi-directional (i.e., representing reciprocal relationships), Burke and Litwin (1992) would have made the arrows circular, if it were possible, to represent reality more accurately. Moreover, Burke and Litwin postulate causal relationships between the variables; the notion of causal relationships has not been hypothesized in previous models. It is asserted that a top-down causal chain exists, in which the top variables have a greater influence on the bottom variables. For example, although culture and systems influence one another (i.e., in a reciprocal manner), Burke and Litwin believe that culture has a stronger influence on systems, given its placement in the hierarchy of the model. The model, therefore, defines the important variables and the important interactions between variables to consider during planned change interventions.

The variables in the model which account for transactional dynamics are depicted in Figure 14; again, this illustration is a truncated version of the model (i.e., the bottom half of the model).

Figure 14

Transactional Variables in the B-L Model

As mentioned, the model has been revised over time by Burke and his colleagues in a series of organizational studies (Bernstein & Burke, 1989). In recent publications, Burke and Litwin have welcomed further empirical investigation of the validity of the organizational model (Burke, Coruzzi, & Church, in Kraut, 1996; Burke, in Howard, 1994).

Theoretical Basis of the B-L Model

Research studies related to each of the organizational variables in the B-L Model are reviewed in this section in order to understand the theoretical underpinnings of the model. It should be noted that both theoretical and empirical articles are, for the most part, included in this review. The empirical articles include studies employing varied research designs, including correlational studies, case studies, and quasi-experimental designs (e.g., employing comparison groups). Further, the variables examined in the various studies are all operationally defined differently. Given the number of constructs (i.e., variables) in the B-L Model and the complexity of the relationships among the constructs (e.g., direct causal relationships, moderating relationships), a thorough critical review of all relevant empirical studies is not feasible for the purposes of this review. However, an attempt has been made to examine the major relationships between variables through a review of representative articles; these articles are listed in Table G.

Table G

Empirical Studies Related to Constructs in the B-L Model

<i>Variables in B-L Model</i>	<i>Relationship</i>	<i>Empirical Studies</i>
✓ External Environment	→ Culture → Mission & Strategy	Gordon, 1985 Prescott, 1986
✓ Leadership	→ Management Practices → Performance → Performance	Fleishman, 1953 Weiner & Mahoney, 1981 Smith, Carson, & Alexander, 1984
✓ Culture	↔ System (policies) → Performance	Kerr & Slocum, 1987 Denison, 1990
✓ Management Practices	→ Climate → Climate	Schneider, 1980 Schneider & Bowen, 1985
✓ Structure	→ Climate → Climate	Schneider & Snyder, 1975 Joyce & Slocum, 1984
✓ Systems	→ Individual Needs & Values	Jordan, 1986
✓ Climate	→ Motivation - Performance	Rosenberg & Rosenstein, 1980
✓ Skills/Job Match	→ Motivation - Performance	Hunter & Schmidt, 1982
✓ Individual Needs & Values	→ Motivation - Performance	Guzzo, Jette, & Katzell, 1985

The methodology and findings from each of the studies are discussed below under the variable headings represented in the B-L Model.

External Environment

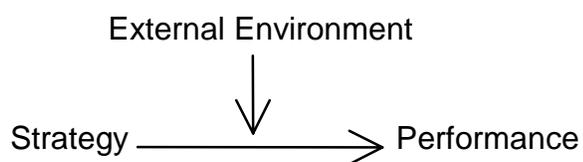
As early as the mid 1960's, Emery and Trist (1965) and Katz & Kahn (1978) speculate that the external environment of the organization has an impact on the internal organization. They characterize the external environment as dynamic (i.e., constantly changing). According to open systems theory, the organization responds to the demands of the external environment in which it operates. Hence, Burke and Litwin include the external environment as an important variable in the B-L Model.

Two empirical studies are reviewed on the impact of the external environment on organization behavior. In the first study, Gordon (in Kilmann, Saxton, Serpa, & Associates, 1985) examines the impact of the external environment on the culture of different types of organizations. He compares utility companies, which operate in a more stable external environment, to high technology manufacturing companies, which operate in a dynamic external environment. Gordon has found that the companies operating in dynamic external environments places higher value on "initiative" (i.e., freedom to act, innovation, and risk taking) and "organizational reach" (i.e., setting aggressive organizational goals) than companies operating in stable environments. In summary, Gordon has found that organizations affected by the external environment develop cultural patterns to meet environmental demands.

In a second study on the external environment of organizations, Prescott (1986) examines organizational strategy and performance. This researcher has used a pre-existing database of data from over 1,500 "business units" collected during 1978-81. Prescott has found that business strategy significantly influences performance, with the external environment moderating the effects of strategy on performance. The relationship found between the variables is as follows:

Figure 15

Variables in Prescott's (1986) Study



As the figure illustrates, the external environment serves as a moderating variable in this case. A moderator variable is a variable which affects the direction and/or strength of the relationship between two other variables.

Leadership

Three studies are related to the construct of leadership in the B-L Model. As an early study, Fleishman (1953) has evaluated the effects of leadership training on management practices in a vehicle production plant. Fleishman has found that leadership attitudes and behavior do not operate in isolation; rather, the social environment of the plant in which the leader works is found to be an important variable related to leader behavior and the effectiveness of leadership training. These findings suggest that leadership, whether training or pre-existing attitudes and behavior, do impact management practice, with the organizational culture serving as a moderating variable.

In a later longitudinal study, Weiner and Mahoney (1981) examine the leadership practices of 193 manufacturing companies from a pre-existing database of company data. They have found that leadership affects two factors related to organizational performance: company profitability and stock prices. They conclude that leadership is important to the performance of an organization.

In a second longitudinal study examining the same two variables, Smith, Carson and Alexander (1984) have also found that effective leadership is associated with improved organizational performance. Interestingly, this study employs a sample of 50 church ministers. Within this type of organization, effective leaders impact the following indicators of organizational performance: church membership growth, property development, and greater membership giving (i.e., donations to the church). In addition to providing support for the relationship between leadership and performance, this study illustrates the importance of studying different types of organizations and not merely corporate entities.

Culture

A study by Kerr and Slocum (1987) examine the association between reward systems of diverse industries (e.g., aluminum, machine tools, pharmaceuticals, food products) and corporate culture. The type of reward system in place in any given organization has to do with the salary, bonuses, stock options, and promotions available; Burke and Litwin include such reward systems in their systems variable. To study this association, these researchers have interviewed eighty executives and upper-level managers. The interview questions are related to the performance appraisal process in the company, the reward systems, and the culture of the company. The open-ended interview questions related to organizational culture pertain to the history of the company, the founders or dominant leaders, and traditions, values, and norms of the work culture. Kerr and Slocum describe the different reward systems they have found and the associated organizational cultural values and norms. Again, not all levels of organizational members are included in Kerr and Slocum's study. Their sample includes executives and high-level managers. Hence, specific types of reward systems for executives are associated with certain corporate cultures.

Denison (1990) has conducted a comparative study of 34 firms in diverse industries (e.g., airline, utility company, medical equipment production). He has examined characteristics of organizational culture in these firms and tracked their financial performance over time. Although Denison has found that organizational culture is correlated with financial performance, some of his measurement indicators differ in the strength of the relationship between culture and

performance. For example, decision making and work design (i.e., indicators of organizational culture) are associated with long-term financial performance whereas supervisory leadership was more associated with short-term financial performance.

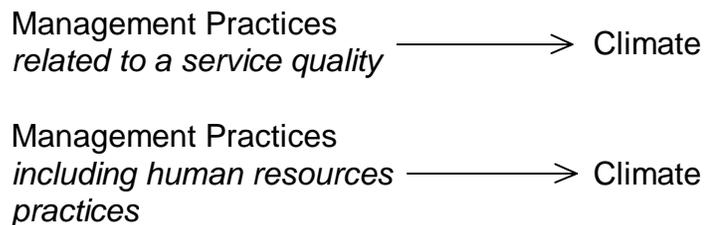
Management Practices

Schneider has conducted two studies related to management practices and service climate. In the first, Schneider (1980) surveys customers and employees of 23 bank branches by mail. Schneider has found that employees' perceptions of climate are positively correlated with customers' perceptions of climate. Further, when employees perceive a strong service orientation from their management, the customers of these branches report receiving superior service. In explaining these findings, Schneider concludes that management practices which emphasize a strong service orientation create a positive overall climate for employees as well as customers.

Schneider and Bowen (1985) replicate their findings in their second study with a similar, but somewhat larger sample of 28 bank branches. In this study, they include questions on the survey which assess human resources practices under the broad area of management practices. Again, they have found a positive correlation between employee's perceptions of human resources practices and customer's perceptions of service climate. Schneider and Bowen conclude that human resources practices can influence service climate. To summarize, Schneider (1980) and Schneider and Bowen (1985) provide some evidence of the following relationships:

Figure 16

Variables in Schneider & Bowen's (1980, 1986) Study



Structure

Schneider and Snyder (1975) have employed a sample of 522 employees (e.g., managers, secretaries, insurance agents) of 50 life insurance agencies in their study of the effects of organizational structure (i.e., arrangement of functions and people). They have found that individuals in the same job categories, i.e., those experiencing the same organizational structure, agree in their perceptions of the climate of the organization. There is also a correlation between job category and job satisfaction, although it is not as strong as the relationship between structure and climate. The findings from this study suggest that organizational structure is somewhat more likely to affect perceptions of organizational climate than individual feelings of job satisfaction.

In a second study of organizational structure, Joyce and Slocum (1984) have studied 220 foreman in various departments of production and fabrication in three heavy-duty truck manufacturing plants. They describe climates as representing “learned environments” for those working within them; as such, climate is found to differ among work units, and, secondly, climate is associated with structure.

Systems

Jordan (1986) examines the effects of various rewards systems on employees’ motivation. Forty-eight health care technicians in a state government pilot program for children with disabilities serve as the sample in this study. Jordan has found that the reward system of an organization does affect employee motivation. In particular, monetary rewards which are contingent upon performance are found to decrease employee’s intrinsic motivation in this study. Burke and Litwin (1992) note that the relationship between rewards and behavior in the workplace is not as straightforward as one might expect. Whether in a positive or negative manner, the reward structure does affect employee’s motivation in Jordan’s study. In another study conducted by Hammer (1988), worker participation combined with a pay for performance reward structure resulted in increased productivity (i.e., performance).

Climate

Rosenberg and Rosenstein (1980) implemented a program over a period of six years (1969-75) in a medium sized plumbing manufacturing company to examine the effect of worker participation on productivity. The program involved employee participation activities (e.g., representation in meetings, participative decision making). In this study, worker participation actually fit Burke and Litwin’s description of work unit climate. Rosenberg and Rosenstein have found that worker participation (i.e., work unit climate) does influence performance. These researchers have also examined the effects of adding a monetary reward within the worker participation program. This motivator does influence performance, although work unit climate remains a more influential factor in influencing performance.

Skills/ Job Match

Hunter and Schmidt (1982, in Campbell, Campbell, & Associates, 1988) have examined the selection criteria used in hiring individuals for specific positions (i.e., person-job match) across industries in a national study. These researchers conclude that the manner in which individuals are fitted to their respective jobs has a significant impact on organizational performance. Interestingly, they postulate that improvements in the use of personnel assignment strategies – namely the use of multivariate statistical selection models – could lead to substantial impacts on organizational productivity (i.e., *performance*) at the national level.

Individual Needs and Values

In their classic book on work redesign, Hackman and Oldham (1980) have emphasized the importance of restructuring jobs to take into account individual differences between people. Expanding upon the notion of work redesign, Hackman and Oldham (1980) suggest that individuals have a need for growth and development on the job and should be motivated by job enrichment interventions. Along these lines, Guzzo, Jette, and Katzell (1985) have conducted a study on the effects of psychological interventions on worker productivity (i.e., performance). In a meta-analysis of 207 productivity experiments published during the period of 1971-81, Guzzo et. al. (1985) have examined work redesign intervention programs. They have found that intervention programs have a significant impact on worker interest, motivation, and performance.

Other Relationships Among Constructs

Not all of the twelve variables in the B-L Model are included in Table H. This omission is not intentional; rather, studies related to omitted variables are not available to date. Given the relatively recent conceptualization of the B-L Model, such empirical studies should be forthcoming. Burke and Litwin acknowledge that the nature of some of the relationships among variables in the model are hypothesized to exist based on their OD practice and experience.

Conclusion

It is evident that the B-L Model was conceptualized from theoretical and empirical literature on organizational behavior. While the studies are varied in terms of their purposes, methodological approach, the specific variables examined, and the operationalization of these variables, as a whole, these studies provide tentative support for the relationships among the constructs in the B-L Model. However, Burke & Litwin wisely call for validation of the B-L Model as a whole through further empirical investigation and causal modeling. Causal modeling procedures used in organizational behavior research is the focus of the next section of this review.

Causal Modeling in Organizational Behavior Research

The Burke-Litwin Model of Organizational Performance and Change (B-L Model) is a representation of an organization, as discussed earlier. In pictorial form, the model is termed a path diagram because it depicts a network of relationships among variables (Hunter & Gerbing, 1982). Once a model such as the B-L Model has been hypothesized from the theoretical literature, causal modeling procedures can be used to test the validity of the model. Causal modeling procedures can estimate both the direction of the relationships between variables and the magnitude of those relationships (Williams & James in Greenberg, 1994). Two common statistical procedures used for such purposes are path analysis and structural equations modeling (SEM).

Path Analysis

Path analysis is a statistical procedure employing multiple regression techniques in the analysis of a path diagram (Williams & James in Greenberg, 1994). This technique was invented by a biostatistician, Sewall Wright, in 1918 (in Bollen, 1989). Path analysis provides more information than is available from performing simple correlations between variables (Gable & Wolf, 1993). In path analysis, the researcher must specify both the independent and dependent variables and the direction of the effect between the variables. The direction of the effect can be one-way, or directional (i.e., nonrecursive), only. Two of the assumptions which must be met in order to apply simple path analytic procedures are fairly restrictive; these include the premise that no measurement error may exist and that the path represents a one-way, directional flow between variables (Bollen, 1989; Bollen & Long, 1993).

SEM

SEM goes beyond classical path analysis and is less restrictive in the assumptions which must be met in order to use the statistical procedure (Gable & Wolf, 1993; Williams & James in Greenberg, 1994). While SEM is more difficult to run and interpret than simple path analysis, it is often preferred over path analysis (Gable & Wolf, 1993). The technique was developed in the 1960's from an integration of econometric and psychometric methods; the approach combines both structural equations from economics and factor analytic techniques from psychology. One purpose of SEM is to determine whether a pattern of relationships in data matches the predictions in a hypothesized model (Gable & Wolf, 1993). Hence, SEM can be used to determine whether an organizational diagnostic model is valid.

As distinct from simple path analysis, SEM requires that a distinction be made between theoretical constructs and measurement indicators (Hunter & Gerbing, 1982). The theoretical constructs in a model are the latent variables (see Table H) which are hypothesized to exist from a review of the research literature. In contrast, the measurement indicator (often an item on a survey instrument) is termed the manifest variable. The behavior of a latent variable can be observed or measured only indirectly, though its effects on a manifest variable. The manifest variable is also termed an observed variable because it can be directly measured. Key features of SEM include the following:

1. Both manifest and latent variables can be measured.
2. Estimates of factor loadings, which indicate the influence of latent variables on manifest variables, are calculated.
3. Estimates of the error variance within manifest variables are calculated.

Table H

Definitions of Variables

<i>Definition of Manifest and Latent Variables</i>		
Variable Type	Definition	Synonymous Terms
<i>Manifest Variable</i>	An observed variable that measures a latent variable	Items, tests, scales, indicators, proxies, overt variables, fallible measures, molecular variables
<i>Latent Variables</i>	A hypothesized theoretical construct	Traits, true scores, domain scores, universe scores, unobserved variables, underlying variables, factors, constructs, and molar variables

Note. Hunter & Gerbing, 1982

This means that SEM simultaneously estimates the relationships between the indicators and the constructs. The degree of the relationships is apparent through the factor loadings. Unlike path analysis, the error variance in the indicators is also calculated. That is, SEM accounts for random measurement error where the assumptions of path analysis do not allow for any measurement error.

Williams and James provide guidance for improving the use of SEM (in Greenberg, 1994). They provide recommendations for researchers applying the technique and suggest that it is good practice to:

- * Satisfy the conditions for confirmatory analysis
- * Give a priori consideration to alternative models
- * Use a measurement tool with high reliability
- * Accept a probability of $p < .05$ for confirming paths predicted to be zero and for paths predicted to be nonzero
- * Cross validate the model

To satisfy the conditions for the confirmatory analysis of the relationships in the path diagram, it is important to (1) specify the direction of all of the relationships in the path diagram, (2) determine whether these relationships are reciprocal or not, and (3) ensure that all variables have been included in the model. The purpose in considering other models in addition to the model being tested is to insure that a second model, similar to the model being tested, is not a better fit. These authors also discuss the inherent weakness in modifying a model post hoc, that is, after the analysis; they suggest that such modification is not grounded in a theoretical basis. Hence, they stress the importance of initially grounding the model to be tested in empirical research.

The measurement instrument, often a survey of organizational members, should also be high in reliability; instruments with relative low reliability have inherently more measurement error.

Good practice also suggests assigning a predicted value of zero (i.e., no relationship) and nonzero (i.e., relationship) to paths in the path diagram. This way, a significance test, employing a probability of $p < .05$, can be used to accept or reject the predicted hypotheses. In the past, researchers have reported only the degree of correlation, without using a test of significance. Finally, the research should be published with cross validation by other researchers encouraged in order to assess the model in other contexts and, hence, the generalizability of the model.

The application of SEM has increased dramatically in organizational research over the past twenty years (Williams & James in Greenberg, 1994). In a review of data analytic procedures used in organizational research during 1975-1993, the use of SEM has increased, while the use of path analysis has decreased markedly (Stone-Romero, Weaver, & Glenar, 1995). For years, the computer program Linear Structural Relations (LISREL) has been the standard in the field for performing SEM (Bollen, 1989, Hatcher, 1994). However, SEM is now more widely available within a variety of statistical packages, including PROC CALIS in SAS, EQS, and AMOS, to name a few (Hatcher, 1994).

References

- Argyris, C. (1970). *Intervention theory and method: A Behavioral Science View*. Reading, MA: Addison-Wesley.
- Baker III, G. A. (1996). National Initiative for Leadership and Institutional Effectiveness: Personal assessment of the college environment. *Unpublished Manuscript*. Raleigh, NC: North Carolina State University.
- Beer, M. & Spector, B. (1993). Organizational diagnosis: Its role in organizational learning. *Journal of Counseling and Development*, 71, 642-650.
- Bernstein, W. M. & Burke, W. W. (1989). Modeling organizational meaning systems. In R. W. Woodman & W. A. Pasmore (Eds.), *Research in Organizational Change and Development* (pp. 117-159). Greenwich, CT: JAI Press.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York, NY: John Wiley & Sons.
- Bollen, K. A. & Long, J. S. (Eds.) (1993). *Testing structural equation models*. Newbury Park, CA: Sage.
- Burke, W. W. & Litwin, G. H. (1992). A causal model of organizational performance and change. *Journal of Management*, 18 (3), 523-545.
- Campbell, J. P., Campbell, R. J., & Associates (Eds.) (1988). *Productivity in organizations*. San Francisco, CA: Jossey-Bass.
- Cummings, T. G. & Worley, C. G. (1993). *Organization development and change. Fifth Edition*. New York, NY: West Publishing.
- Denison, D. R. (1990). *Corporate culture and organizational effectiveness*. New York, NY: John Wiley & Sons.
- Emery, F. E. & Trist, E. L. (1965). The causal texture of organizational environments. *Human Relations*, 18, 21-32.
- Fleishman, E. A. (1953). Leadership climate, human relations training, and supervisory behavior. *Personnel Psychology*, 6, 205-222.
- Fordyce, J. K. & Weil, R. (1983). Methods for finding out what's going on. In W. L. French, C. H. Bell, & R. A. Zawacki (Eds). *Organization Development: Theory, Practice, and Research* (pp. 124-132). Plano, TX: Business Publications.
- French, W. L. & Bell, C. H. (1995). *Organization development: Behavioral science interventions for organization improvement. Fifth Edition*. Englewood Cliffs, NJ: Prentice Hall.
- Fuqua, D. R. & Kurpius, D. J. (1993). Conceptual models in organizational consultation. *Journal of Counseling and Development*, 71, 607-618.
- Gable, R. K. & Wolf, M. B. (1993). *Instrument development in the affective domain: Measuring attitudes and values in corporate and school settings*. Boston, MA: Kluwer Academic Publishers.

- Greenberg, J. (1994). *Organizational behavior: The state of the science*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Guzzo, R. A., Jette, R. D. & Katzell, R. A. (1985). The effects of psychologically based intervention programs on worker productivity. *Personnel Psychology*, 38, 275-291.
- Hackman, J. R. & Oldham, G. R. (1980). *Work redesign*. Reading, MA: Addison-Wesley.
- Harrison, M. I. (1987). *Diagnosing organizations: Methods, models, and mrocesses*. Newbury Park, CA: Sage.
- Hatcher, L. (1994). *A step-by-step approach to using the SAS system for factor analysis and structural equation modeling*. Cary, NC: SAS Institute.
- Howard, A. (Ed.) (1994). *Diagnosis for organizational change: Methods and models*. New York, NY: The Guilford Press.
- Hunter, J. E. & Gerbing, D. W. (1982). Unidimensional measurement, second order factor analysis, and causal models. *Research in Organizational Behavior*, 4, 267-320.
- Jordan, P. C. (1986). Effects of an extrinsic reward on intrinsic motivation: A field experiment. *Academy of Management Journal*, 29, 405-412.
- Joyce, W. F. & Slocum, J. W. (1984). Collective climate: Agreement as a basis for defining aggregate climates in organizations. *Academy of Management Journal*, 27, 721-742.
- Katz, D. & Kahn, R. L. (1978). *The Social psychology of organizations*. (2nd ed.). New York, NY: Wiley.
- Kerr, J., & Slocum, J. W. (1987). Managing corporate culture through reward systems. *Academy of Management Executive*, 1, 99-108.
- Kilmann, R. H., Saxton, M. J., Serpa, R., & Associates (Eds.) (1985). *Gaining control of corporate culture*. San Francisco, CA: Jossey-Bass.
- Kolb, D. A. & Frohman, A. L. (1970). An organization development approach to consulting. *Sloan Management Review*, 12, 51-65.
- Kraut, A. I. (Ed.) (1996). *Organizational surveys: Tools for assessment and change*. San Francisco, CA: Jossey-Bass.
- Leavitt, H. J. (1965). Applied organizational change in industry. In J. G. March (Ed.), *Handbook of Organizations* (pp. 1144-1170). New York, NY: Rand McNally.
- Lewin, K. (1951). *Field theory in social science*. New York, NY: Harper.
- Likert, R. (1967). *The human organization: Its management and value*. New York, NY: McGraw-Hill.
- Litwin, G. H. & Stringer, R. A. (1968). *Motivation and organizational climate*. Boston, MA: Harvard Business School Press.
- Manzini, A. O. (1988). *Organizational diagnosis: A practical approach to problem solving and growth*. New York, NY: American Management Association.
- Nadler, D. A. & Tushman, M. L. (1980). A model for diagnosing organizational behavior. *Organizational Dynamics*, Autumn, 35-51.

- Nelson, L., & Burns, F. L. (1984). High performance programming: A framework for transforming organizations. In J. Adams (Ed.), *Transforming Work* (pp. 226-242). Alexandria, VA: Miles River Press.
- Pascale, R. T. & Athos, A. G. (1981). *The art of japanese management: Applications for American executives*. New York, NY: Simon & Schuster.
- Peters, T. J. & Waterman, R. H. (1982). *In search of excellence: Lessons from america's best-run companies*. New York, NY: Harper & Row.
- Porras, J. I. & Berg, P. O. (1978). The impact of organization development. *Academy of Management Review*, 3, 249-266.
- Prescott, J. E. (1986). Environments as moderators of the relationship between strategy and performance. *Academy of Management Journal*, 29, 329-346.
- Rosenberg, R. D. & Rosenstein, E. (1980). Participation and productivity: An empirical study. *Industrial and Labor Relations Review*, 33, 355-367.
- Rothwell, W. J. & Sredl, H. J. (1992). *The ASTD reference guide to professional human resource development roles & competencies*. (2nd ed.). Amherst, MA: HRD Press.
- Schneider, B. (1980). The service organization: Climate is crucial. *Organizational Dynamics*, 9 (2), 52-65.
- Schneider, B. & Bowen, D. E. (1985). Employee and customer perceptions of service in banks: Replication and extension. *Journal of Applied Psychology*, 70, 423-433.
- Schneider, B. & Snyder, R. A. (1975). *Journal of Applied Psychology*, 60 (30), 318-328.
- Smith, J. E., Carson, K. P., & Alexander, R. A. (1984). Leadership: It can make a difference. *Academy of Management Journal*, 27, 765-776.
- Stone-Romero, E. F., Weaver, A. E., & Glenar, J. L. (1995). Trends in research design and data analytic strategies in organizational research. *Journal of Management*, 21 (1), 141-157.
- Tagiuri, R. & Litwin, G. H. (Eds.) (1968). *Organizational climate: Explorations of a concept*. Cambridge, MA: Harvard University Press.
- Tichy, N. M. (1983). *Managing strategic Change: Technical, political, and cultural dynamics*. New York, NY: John Wiley & Sons.
- Tichy, N. M., Hornstein, H. A., & Nisberg, J. N. (1977). Organization diagnosis and intervention strategies: Developing emergent pragmatic theories of change. In W. W. Burke (Ed.), *Current Issue and Strategies in Organization Development* (pp. 361-383). New York, NY: Human Sciences Press.
- Weiner, N. & Mahoney, T. A. (1981). A model of corporate performance as a function of environmental, organizational, and leadership influences. *Academy of Management Journal*, 24, 453-370.