ORGANIZATIONAL SUPPORT SYSTEMS FOR TEAM-BASED ORGANIZATIONS: EMPLOYEE COLLABORATION THROUGH ORGANIZATIONAL STRUCTURES

DISSERTATION

Presented to the Graduate Council of the University of North Texas in Partial Fulfillment of the Requirements For the Degree of DOCTOR OF PHILOSOPHY

By

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Hall, Christopher, A. *Organizational support systems for team-based organizations: Employee collaboration through organizational structures.* Doctor of Philosophy (Counseling Psychology), August, 1998, 506 pp., 38 tables, 20 illustrations, references, 154 titles.

The purpose of this study was to examine relationships between organizational support and Effectiveness, Empowerment, and team characteristics. Support was operationalized by nine systems: Executive Management, Direct Supervision, Group Design, Performance Definition, Performance Review, Training, Rewards, Information, and Integration. Support was rated in two ways: how important is support for performing work (Importance scales), and how does support describe work environments (Presence scales).

Correlations indicate low relationships between Importance and Effectiveness. A low relationship was found between important executive management behaviors and effectiveness. High correlations between Importance scales suggest that alignment between systems is an important component of supportive organizational contexts.

Importance and Presence scale comparisons suggest that organizations are providing less organizational support than ideal. Group Design and Defining Performance had the highest means for both Importance and Presence scales. Employees were least satisfied with Rewards and Executive Management support. Organizations may have the most difficulty implementing these systems.
Organizational support was directly related to perceived Empowerment and Effectiveness. To "empower" employees and increase effectiveness, organizations might implement supports studied in this research. Empowerment might be defined by organizational support. Highly empowered groups appear to require specific organizational supports.

Effectiveness analyses suggest that organizational contexts emphasize Customer Satisfaction and Resource Utilization and Development. This may decrease available support for Psychological Effectiveness and Team Effectiveness. Organizations might balance planned outcomes by meeting subtle and obvious types of Effectiveness. Further, the Group Design and Defining Performance scales best predict Effectiveness. Different organizational supports may be needed to reinforce different types of Effectiveness.

No differences were found between Importance scales as a function of team or nonteam membership. Systems measured by the Support Systems Survey may reflect important components of organizational contexts, even if organizations do not utilize teams. Support differences were found for distinct supervisor styles and different team durations. No support differences were found for different team tasks or single- or multi-functional teams. Suggestions for future research are provided.
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CHAPTER I

INTRODUCTION

The Need for Work Teams

The development of global markets (Miles & Snow, 1994), the rapid pace of technological change (Davis, 1971; Miles & Snow, 1994), changes in worker needs (Davis, 1971; Offermann & Gowing, 1990; Walton, 1978), and other changes, are driving a historically unprecedented revolution in the way organizations do business (Clemmer & Sheehy, 1992; Davis, 1971; Marshall, 1995; Miles & Snow, 1994; Peters, 1986; Purser & Pasmore, 1992). Many organizations are meeting these challenges by implementing work teams (Ancona, 1990; Breer & Walton, 1990; Cohen, 1994; Drucker, 1988; Fisher, 1993; Orsburn, Moran, Musselwhite, & Zenger, 1990; May & Schwoerer, 1994; Ray & Bronstein, 1995; Robbins & Fredendall, 1995; Sundstrom, De Meuse, & Futrell, 1990; Tubbs, 1994).

Work teams are popular among organizations because they produce many benefits for workers and their employers if implemented correctly (Harrington-Mackin, 1994; Maddux, 1986; Manz & Sims, 1993; Ray & Bronstein, 1995; Shonk, 1992). For example, psychological benefits for employees include the fulfillment of intrinsic needs (Maddux, 1986; Robbins & Fredendall, 1995); increased feelings of self-worth (Harrington-Mackin, 1994); employment in a better work climate (Harrington-Mackin,
1994); feelings of control as employees often participate in setting their goals and participate in determining how their work is done (Maddux, 1986; Ray & Bronstein, 1995); feelings of competence through the continued training of employees (Shonk, 1992); and increased employee satisfaction (Shonk, 1992). Benefits for employers include increased quality (Manz & Sims, 1993; Ray & Bronstein, 1995; Shonk, 1992), flexibility (Harrington-Mackin, 1994; Manz & Sims, 1993; Mohrman et al., 1995; Shonk, 1992), coordination (Harrington-Mackin, 1994; Maddux, 1986; Mohrman et al., 1995) and increased productivity (Manz & Sims, 1993; Ray & Bronstein, 1995; Shonk, 1992).

**Organizational Context and Team Effectiveness**

Unfortunately, the successful implementation of teams is extremely difficult (Orsburn et al., 1990) and the effects of organizational contexts on teams is often underestimated (e.g., Mohrman et al., 1995). Organizations must learn to play by "new rules" (Harrington-Mackin, 1994). Managers need to develop new philosophies and new methods of thinking about employees—methods that may be unnatural for leaders accustomed to traditional hierarchical management systems (Manz & Sims, 1993). Motivating work roles must be established that eclipse traditional hierarchical boundaries of control and job specialization (Pasmore, 1988). Salaries and training costs increase, additional training personnel are often needed, individuals expectations for personal growth and development can develop, and resistance by support staff can occur (Lawler, 1986). Thus, companies must reengineer their internal systems and structures to support
teams (Mohrman et al., 1995; Shonk, 1992), because many teams fail in unsupportive organizational contexts (Pasmore, Francis, Haldeman, & Shani, 1982).

Research on teams is also shifting from understanding internal group processes to understanding how organizations affect groups (e.g., Ancona, 1990). This shift in research is necessary, since groups and teams have high external boundary demands (Ancona, 1990), including high levels of commitment from managers and organizational systems (Beer & Walton, 1990). As a consequence, the importance of organizational context is now included in most models of work team effectiveness (e.g., Campion, Medsker, & Higgs, 1993; May & Schwoerer, 1994; Pearce & Ravlin, 1987). However, many organizational context level variables included in these models appear incomplete. For instance, Sundstrom et al. (1990) do not address leadership behaviors, information systems, communication systems, methods for setting goals, determining resources, and making trade-offs between teams, or mechanisms for determining effective performance. May and Schwoerer (1994) do not address leadership behaviors and goal-setting, resource allocation, priority setting, and trade-off mechanisms. These examples suggest the need for an integration of the literature regarding organizational level context variables that support teams.

**Purpose of Paper and Overview**

This paper addresses the importance of organizational contextual variables and their relationship to team effectiveness. Organizational context variables (e.g., rewards, goals, or performance management processes, etc.) are referred to as support systems. System refers to the smaller or micro-systems (e.g., training system) that make up the
entire system (i.e., the organization). A support system is an organizational micro-system which supports the ability of employees to work collaboratively. For instance, training systems might help employees develop group meeting skills, which improves collaboration, or information systems might help employees communicate, which improves collaboration. Moreover, support systems are composed of “mechanisms”—specific examples of a support systems. Whereas training might be referred to as a support system, training on group meeting skills is a mechanism (a specific instance of a support system).

Support systems encompass Lorsch’s (1980) distinction between the basic structure and operating mechanisms of an organization. Basic structure refers to how work is divided into groups, departments, etc., and coordination mechanisms that achieve organizational directives. Operating mechanisms refer to procedures, information systems, reward systems, physical arrangements, etc., that direct and motivate individuals to meet organizational goals. Further, support systems include Pfeffer’s (1978) definition of organizational design—the grouping of organizational activities, roles, and positions in order to effectively coordinate interdependencies.

Before important systems can be identified, different types of teams and the difference between different work settings must be addressed, since support needs for teams appear to vary depending on the work setting (Pava, 1983, 1986; Purser & Pasmore, 1992; Mohrman et al., 1995). For example, the implementation of teams in “white-collar settings, often referred to as "knowledge work" teams (e.g., McDermott, 1995; Mohrman et al., 1995), produces a set of problems and issues different from those
produced when implementing teams in production-based settings (Pava, 1986; Purser & Pasmore, 1992; Mohrman et al., 1995). Further, a full understanding of problems and issues in implementing knowledge work teams is important in and of itself, since knowledge work is critical to the continuing competitiveness of organizations (McDermott, 1995). When compared to workers in production-based settings, knowledge workers often serve in organizational functions related to a firm's overall performance (Pasmore, 1988). At the same time, as the economy changes from an industrial to an information economy, organizations may one day view all employees as knowledge workers (e.g., Gunn, 1987; Nolan & Croson, 1995).

Thus, this paper discusses differences between two broad types of teams, production-based and knowledge-based work teams, and how organizations can be structured to facilitate collaborative employee behaviors. First, traditional management principles, changing organizational needs, and changing employee needs are discussed; then, characteristics of work teams are described and the differences between production-based work teams and knowledge-based work teams are clarified; sociotechnical systems theory is described; sociotechnical systems theory is reexamined in terms of changes that may be more suitable for knowledge-based work teams; models of work team effectiveness are presented to identify support systems for teams; a model for structuring team-based organizations is presented; systems that support team-based organizations are identified and discussed; and a process is documented that will result in an instrument capable of determining an organization’s status for systems that support employee collaboration and the successful implementation of work teams.
CHAPTER II

LITERATURE REVIEW

Classical Management Principles

The first section of this paper begins with classical management principles, which is important to the discussion of support systems and work teams for several reasons: (1) the classical or scientific management approach continues to dominate the structure and organization of firms (Davis, 1971; Lawler, 1992; Nolan & Croson, 1995); (2) classical management principles serve as assumptions that affect how employees are treated at work and how work is organized (e.g., Marshall, 1995; Pasmore, 1988); (3) classical management principles can act as barriers to employee participation (Lawler, 1992); (4) some authors consider classical management principles to be ineffective in today's economic environment (Clemmer & Sheehy, 1992; Lawler, 1992; Marshall, 1995); and (5) the implementation of teams challenges the effectiveness of classical management principles in organizing work (Purser & Pasmore, 1992). Thus, organizations' structures continue to be designed according to classical management principles, and classical management principles often interfere with team effectiveness.

Classical Management Principles Defined and Affects Upon Work

Classical management principles include: (1) the division of labor; (2) authority and motivation; (3) hierarchy of authority; (4) the line-staff organization; (5)
centralization; and (6) departmentalization (Galbraith, 1977). These principles are discussed in detail below and their effects upon work are briefly explained.

**Division of Labor**

Galbraith (1977) argued that for the classical management theorist, organizational design begins by dividing tasks into subtasks and assigning these tasks to individuals. Breaking work into subtasks overcomes the physical and cognitive limitations of workers, since each worker can become skilled at the smaller task. Developing easily mastered tasks was important at the time classical management principles were introduced, because much of the North American work force consisted of poorly educated immigrants (Lawler, 1992).

Galbraith (1977) indicated, however, that breaking tasks into subtasks had several effects upon the organization of work. Breaking the task into parts: (1) increased the interdependence between workers performing the subtasks; (2) created problems in coordinating the subtasks; and (3) sometimes decreased performance reliability. To solve these problems, classical management theorists introduced an additional principle called the vertical division of labor. Through division of the work vertically, a managerial role was created that controlled, monitored, coordinated, and integrated the work from subordinate's specialized work roles. However, adding a managerial role had two effects upon the organization of work: (1) once the whole task was divided into subtasks and managers assumed control and coordination functions, how could employees be motivated to perform efficiently; and (2) how could responsibility and
authority roles be separated between managers when more than one managerial role was required?

Authority and Motivation

One result from applying division of labor principles to organizations was the discovery that the classical management approach to job design did not motivate employees through the work itself (Galbraith, 1977; Lawler, 1992). Decision-making and work integration became embedded in the role of the supervising manager (Galbraith, 1977). To compensate for the lack of motivation among workers, classical management theorists advocated the use of financial incentives, such as piece-rate incentives, and the increased use of authority by managers (Galbraith, 1977). For example, managers were granted the power to award promotions, give raises, and fire inefficient workers. By giving the authority to reward and punish employees to managers, organizations could resolve employee motivational problems resulting from the division of labor (Galbraith, 1977).

Hierarchy of Authority

Galbraith (1977) reported that another result from applying division of labor principles to organizations was the difficulty of dividing responsibility and authority roles among managers when several managerial roles were required. One solution advocated by classical management theorists was to apply the division of labor principle again, to managers. Thus, managers would become responsible for a clearly defined segment of work similar to the workers they directed. To apply classical management principles to
managers, theorists developed two new design principles: (1) the unity of command principle and (2) the scaler principle.

According to Galbraith (1977) under the unity of command principle, individuals receive direction from one superior; in more complicated organizations where work requirements were often confusing, individuals reported to one superior when conflicts occurred. In the scaler principle, authority is said to flow in a clear, unbroken line from the highest manager to the lowest worker. This results in a hierarchy of authority which resembles a pyramid. Each person in the pyramid was obligated to follow the directives of his or her superior, and the superior was responsible for coordinating the work of his or her subordinates.

Further, Galbraith (1977) contended that through the unity of command principle and the scaler principle, organizations granted managers the authority and responsibility for coordinating interdependent work roles and for motivating subordinates. However, granting responsibility and authority roles presented organizations with another design choice: On what attribute or characteristic should authority roles be established? Should the role be based on the rank of the individual or the expertise of the individual?

By modeling military and church organizations, Galbraith (1977) argued that classical management theorists choose authority based on rank over authority based on expertise as the preferred method for determining responsibility and authority roles. This arrangement, however, produced an additional problem in that managers often lacked the expertise needed to make complicated decisions in their work areas. Thus, managers
needed to coordinate their efforts with individuals who possessed the necessary knowledge. One solution to this problem was the line-staff organization.

Line-Staff Organization

To maintain the needed expertise in complicated decisions, Galbraith (1977) argued that a new specialist staff role was created so that line managers could receive expert advice from staff specialists and still maintain responsibility for their decisions. Even so, confusion often resulted, because the distinction between the decision-making authority of line managers and the decision-making authority of staff specialists was unclear. Organizations addressed the issue by developing partitions of authority between decisions made by staff specialists and decisions made by line managers and by including other line managers when conflicts occurred. As a result, these conflicts produced several important outcomes: (1) a hierarchy of authority was established to solve conflicts; and (2) new organizational design choices were created—centralization and departmentalization.

Centralization

According to Galbraith (1977) centralization refers to the degree that decisions were made at the "top" of the organizational pyramid. If most decisions were made at the top levels of the organization, then the firm was considered highly centralized; organizations where decision-making authority was made at lower levels were considered decentralized. Thus, the centralization-decentralization continuum refers to the extent that power is distributed vertically along the organizational hierarchy and to the extent that work is divided among managers. For example, if power is decentralized, decisions
could become fragmented and noncoordinated so that a decision made by one manager could adversely affect another manager. Dividing the work into departments, however, allows decisions to be made by individuals within the department without adversely affecting other departments.

Departmentalization

Finally, Galbraith (1977) indicated that the last classical management principle, departmentalization, referred to the extent to which work roles were formed into groups, departments, units, or divisions. For example, work can be divided on the basis or purpose of the task, the process of the task, the persons involved in the task, the task resources, or the physical location of the task. Departmentalization is complex as there are many alternatives and methods for segmenting the work, and at each level of the organizational hierarchy, choices must be made on how to departmentalize work processes. Departmentalization may have been more important when companies developed competitive advantage through mass production and the development of national markets (e.g., Miles & Snow, 1994). Today, economies of scale are less important, since they are often circumvented with various types of organizational partnerships (Galbraith, 1994).

The Functional Organization

The discussion of classical management principles suggest that companies organized by these principles are heavily dependent on functional work specialties. Functional organizations arrange their resources into functional settings, such as marketing, manufacturing, accounting, and customer service, and outputs from these
specialty functions are coordinated by centrally developed plans and schedules (Miles & Snow, 1994). The core operating logic of the functional organization is the cost efficient production of good or services via the plans and controls of centrally organized functional specialists (Miles & Snow, 1994). However, as will be seen, work teams often are formed of members from different organizational functions. Further, work teams often challenge the ability of companies to organize under centrally developed plans and schedules.

The Current Status of Classical Management Principles

Today, the classical management principles of division of labor, authority and motivation, hierarchy of authority, the line-staff organization, centralization, and departmentalization, heavily influence how firms are structured and organized (Davis, 1971; Lawler, 1992). However, several authors challenge different aspects of the classical management approach. The lack of motivation in job design (Davis, 1971; Lawler, 1992); the rapid pace of technology change (Beer & Walton, 1990; Davis, 1971; Purser & Montuori, 1995); current economic trends (Galbraith & Lawler, 1993; Miles & Snow, 1994); and problems meeting the needs of employees (Herman, 1995; Offermann & Gowing, 1990; Walton, 1978) are several of the factors that are limiting the effectiveness of classical management principles in today's business environment (Clemmer & Sheehy, 1992; Lawler, 1992; Marshall, 1995).

Demotivating Effects

Davis (1971) illustrates how classical management principles can produce demotivating work roles and ineffective workers. For example, elements of the classical
management approach that can decrease motivation include: (1) work costs are reduced by decreasing the skill contribution of workers and breaking the job into fractions; (2) supervisors are the only individuals that possess the knowledge and skills needed to perform uncertain or variable job functions; (3) workers perform work the machine cannot perform; (4) organizations can use any available social mechanism to enforce compliance and maintain stability; (5) technological requirements provide an optimum outcome whereas satisfying social systems increases costs; and (6) since technology is assumed to be value-free, the design and planning of production technologies is norm- and value-free. Thus, Davis argued that classical management principles can reduce employee motivation at work,

Although Davis' (1971) work has been criticized as "propagandist" (Kelly, 1978), Davis clearly demonstrates how classical management principles can produce demotivating jobs. Further, demotivating work roles can increase business costs (Lawler, 1992). For example, significant cost associated with classical management principles include: an elaborate hierarchy of measurement systems, discipline systems, reward systems, and management systems must be developed to control the work processes, because employees are neither motivated by their work nor committed to the organization; initially low labor costs increase, because workers find the work uninteresting and feel entitled to higher wages; and work systems and automated equipment that standardize and simplify work are often expensive (Lawler, 1992).
Changing Technology

In addition to costs associated with demotivating job designs, technological change and new information technology are currently influencing the effectiveness of classical management principles in the design of competitive organizations (Beer & Walton, 1990; Davis, 1971; Purser & Montuori, 1995). For example, high rates of technological change have increased the division between manual and intellectual labor and have challenged the view that employees are interchangeable parts (Davis, 1971; Purser & Montuori, 1995). Further, new computer production and communication technologies are forcing organizational managers to reevaluate the ongoing relationship between their technology and employees (Beer & Walton, 1990). New production equipment and techniques are requiring additional employee skills (Davis, 1971; Gunn, 1987), skills that are used only occasionally (Davis, 1971), or skills that span multiple departments (Gunn, 1987).

Changing technology also challenges the effectiveness of classical management principles in other ways. Beer and Walton (1990), for example, argued that new information technology affects how managers monitor information in the environment and how this information is processed throughout the organization's internal structures. In order to effectively process new information and respond quickly to changes, organizations must sense the information in the environment, relay the information to the appropriate departments, and act on that information. Organizations who involve employees in their work, become less hierarchical and integrate across functional departments, are more able to generate quick responses to changing environments.
Economic Environment

In addition to difficulties that arise from changing technological demands, classical management principles often fail to generate the competitive advantage needed to sustain performance in the current economic environment, (Clemmer & Sheehy, 1992; Lawler, 1992; Marshall, 1995). The need for a quick response to market conditions, the high cost of producing goods and services, and the need for increased quality, are forcing organizations to change (Galbraith & Lawler, 1993). For example, bureaucracy and hierarchy of authority are being replaced by customer control, peer control, and automated formal controls (Galbraith & Lawler, 1993). In addition, many organizations are focusing on their core work processes and purchasing needed goods and services from other companies, thus, removing entire layers of hierarchy (Miles & Snow, 1994). Organizations are finding increased flexibility and better decision-making through decentralized structures and by reducing the extent to which they rely on functional divisions (Galbraith, 1994).

Employee Needs

Finally, employees' needs are often at odds with classical management principles. For example, employees want more challenge and growth in their jobs; employees wish to be included in decision-making; employees want work that is intrinsically rewarding; employees desire to be treated in a dignified manner; employees wish to be employed by organizations that are socially responsible; and employees want more attention given to the emotional aspects of organizational life (Walton, 1978). Employees want more training; a greater sensitivity to the needs of worker's families; and greater attention to
employee's attitudes such as an increased desire for autonomy, needs for self-development, needs for meaningful work experiences, and needs for increased involvement in decision-making (Offermann & Gowing, 1990).

**Classical Management Principles Revisited**

In fairness to classical management principles, it should be noted that the approach may have evolved beyond the views of its principle advocates. For example, F. E. Taylor (1911) argued that the "principal object of management should be to secure the maximum prosperity for the employer, coupled with the maximum prosperity for each employee" (p. 9). Nonetheless, Taylor also argued that there "is no question that the tendency of the average man (in all walks of life) is toward working at a slow, easy gait" (p. 19); that there is a "... natural instinct and tendency of men to take it easy..." (p. 19); and that "hardly a competent workman can be found...who does not devote a considerable part of his time to studying just how slow he can work and still convince his employer that he is going at a good pace" (p. 21).

Further, classical management principles remain applicable to some work settings. For example, the control-oriented nature of classical management principles may be best suited to work settings where: the work is simple; the work is stable; there is little need for problem-solving or coordination; labor costs are low or individuals lack important work skills; and the system-development costs can be minimized by developing a work process that operates in the same manner for a long period of time (Lawler, 1992).
Developing Competitive Advantage Through Employees

However, in other work settings, classical management principles are not meeting the needs of organizations (Clemmer & Sheehy, 1992; Lawler, 1992; Marshall, 1995). Further, the lack of motivation in job design (Davis, 1971; Lawler, 1992); the rapid pace of technology change (Beer & Walton, 1990; Davis, 1971; Purser & Montuori, 1995); current economic trends (Galbraith & Lawler, 1993; Miles & Snow, 1994); and problems meeting the needs of employees (Herman, 1995; Offermann & Gowing, 1990; Walton, 1978) appear to raise one central question: How do companies reinvent organizational structures that support and encourage employee involvement and collaboration, and that meet organizational goals? Involving employees in all levels of the firm in the organization's business is crucial to developing competitive advantage (Lawler, 1992). Organizations that continuously invest in their employees will maintain competitiveness in an constantly changing environment (Miles & Snow, 1994).

In addition, by developing internal structures that support workers and that meet organizational goals, companies may find that they are able to develop an unique and highly competitive tool available only to that firm—organizational capability (Galbraith, 1994). Organizational capability refers to the alignment of management processes (strategies, structures, processes, rewards, and supportive worker practices) and the effectiveness of human talent in developing lateral capabilities across functions, across other business units, or across countries and regions. Organizing laterally refers to the decentralization of management decisions to individuals with direct product knowledge and/or customer contact (Galbraith, 1994). The problem becomes, then, how to best
develop lateral and dynamic internal structures and systems that maximize employee collaboration and that adapt to changing economic, social, and technological demands. This is discussed further in the next chapter of this paper.

**Work Teams**

Work teams, a sophisticated form of employee collaboration, are a useful mechanism for organizing laterally across functions (Deming, 1986; Galbraith, 1994) and for meeting organizational and individual needs (Harrington-Mackin, 1994; Maddux, 1986). While not applicable to all settings (Dyer, 1994; Mohrman, Cohen, & Mohrman, 1995), the appropriate use and support of work teams appears to be an excellent method for developing motivating jobs, meeting organizational goals, and realizing an individual's potential (Harrington-Mackin, 1994; Manx & Sims, 1993; Ray & Bronstein, 1995). The successful implementation of work teams can produce a highly motivating environment, better work climate, improved self-worth (Harrington-Mackin, 1994), and an organization where people are more satisfied with their work (Manz & Sims, 1993; Ray & Bronstein, 1995). In the next section of this paper, work teams are examined in more detail.

**Characteristics of Work Teams**

The following develops an understanding of work teams for the reader by discussing characteristics of teams on several dimensions. First, popular definitions of work teams are presented; then, the differences between work teams and naturally occurring work groups are discussed; the concept of empowerment and work teams is reported; types of work teams are presented; and for the purposes of this paper, a critical
distinction is made between production-based work teams and knowledge-based work teams. Work teams are defined on several dimensions, since work teams fulfill many different needs for organizations (Ray & Bronstein, 1995) and a commonly accepted definition of work teams is difficult to find (Manz & Sims, 1993).

**Popular Definitions of Work Teams**

Researchers define work teams in different ways. For example, Katzenbach and Smith (1993) defined teams as a "...small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable" (p. 45); Orsburn, et al. (1990) defined teams as a "...highly trained group of employees, from 6 to 18, on average, fully responsible for turning out a well-defined segment of finished work" (p. 8); and Sundstrom et al. (1990) defined teams as an "...interdependent collections of individuals who share responsibility for specific outcomes for their organizations" (p. 120).

In contrast, some authors define teams more generally. Shonk (1992), for instance, argued that teams consist of people who must coordinate to reach a common goal, and that organizations naturally consist of teams. Whereas Shonk appears to be referring, at least in part, to naturally occurring work groups, Katzenbach and Smith (1993), Orsburn et al. (1990), and Sundstrom et al. (1990), appear to be describing teams with more specific attributes. Thus, one aspect of teams that needs clarification is the distinction between work teams and naturally occurring work groups.
Naturally occurring work groups can be defined as "...a set of three or more people that can identify itself and be identified by others in the organization as a group" (Shea & Guzzo, 1987, p. 25). Further, work teams differ from naturally occurring work groups in several ways. First, work teams generally have a greater degree of control over the execution and management of group tasks (e.g., allocating jobs to employees, determining production levels, or selection and training of new team members) (Hollander & Offermann, 1990). Second, groups can be characterized as closed systems, whereas work teams operate as open systems (Ancona, 1990). For example, work teams are often responsible for complex interactions with individuals beyond the boundaries of most groups (Ancona, 1990). Finally, naturally occurring groups and work teams can be distinguished along three additional dimensions: job categories, authority, and reward systems. For conventional groups: (1) jobs are usually narrowly defined; (2) authority is generally low as daily activities are normally controlled by a supervisor; and (3) rewards are generally related to the type of job, the individual's performance, and the seniority of the individual. For work teams, however: (1) jobs are usually based on several broad categories; (2) authority is high as the team controls the daily activities of team members; and (3) rewards are normally based on the performance of the team and the breadth of an individual's skills (Orsburn et al., 1990).

The definition of work teams (Katzenbach & Smith, 1993; Orsburn et al., 1990; Sundstrom et al., 1990), and the differences between work teams and naturally occurring work groups (Ancona, 1990; Hollander & Offermann, 1990; Orsburn et al., 1990)
highlight the importance to work teams of authority, responsibility, decision-making ability, and control over the management of tasks. Thus, another aspect of teams that needs clarification is the importance of power and teams, because teams vary in terms of the delegation of power to members (Hollander & Offermann, 1990). The following gives a description of power and teams referred to by some authors as empowerment (e.g., Fisher, 1992) and a related taxonomy of teams based on the sharing of power between team members and management (Ray & Bronstein, 1995).

**Empowerment**

One way of explaining the difference between types of work teams is to understand the extent to which a work team is empowered. For example, Fisher (1993) defines empowerment in terms of four elements: authority, resources, information, and accountability. Fisher presents these elements as a formula—Empowerment = (authority, resources, information, accountability)—to determine the extent to which a team is empowered. Fisher argued that if any of the four variables (authority, resources, information, or accountability) are not present for that team, then the team lacks empowerment. Asking employees to make decisions, for instance, without the necessary business information or without the time to accomplish the task, will usually result in failure. Fisher also argues that empowerment can be visualized as running along a continuum. In the definitions of naturally occurring work groups and work teams provided above, natural occurring work groups would be on the low end of an empowerment scale and work teams would be at the high end of an empowerment scale.
Thus, in distinguishing between teams by means of empowerment, teams will vary in terms of the delegation of power to subordinates (Hollander & Offermann, 1990), through authority, resources, information, and accountability (Fisher, 1993). However, managers may find the process of empowering teams and passing control to lower levels extremely intimidating and as a potential loss of status and power (Manz & Sims, 1993). Accordingly, one way of characterizing teams is through the balance of power between team members and the team's leader, manager, or supervisor (Hackman, 1992; Ray & Bronstein, 1995).

**Power Relationships Between Management and Teams**

Many authors characterize teams by the power (i.e., the ability of an individual to overcome resistance to achieving a desired outcome; Pfeffer, 1981) and authority (power that is legitimately given to individuals by the organization; Pfeffer, 1981) relationship between managers and team members. The authority to manage internal and external process is important to teams (Fisher, 1993)—authority is related to the social control of behavior (Pfeffer, 1981). The following briefly discusses two ways of classifying power and authority relationships between team members and managers.

For example, Hackman (1992) distinguished between authority in terms of four functions: (1) who executes work; (2) who monitors and manages work processes; (3) who designs performing units and organizational supports; and (4) who sets direction for organizational units. Further, how authority is distributed among these four functions can characterize four types of work units—manager-led groups, self-managing groups, self-designing groups, and self-governing groups. Manager-led groups have authority for
executing tasks; managers monitor performance processes, set direction for the unit, and structure the unit. Self-managing groups are responsible for executing tasks and monitoring and managing processes. However, managers are responsible for setting direction and structuring the unit. Self-designing groups can modify the unit's design or organizational context in which the unit performs work. Managers remain responsible for setting the unit's direction. Finally, self-governing groups are responsible for all four functions described above.

In another example of power and authority relationships between managers and teams, Ray and Bronstein (1995) argued that teams can be categorized into five types extending along a continuum from traditional leader-focused teams to "true" teams or self-led teams. For example, Type I teams are highly dependent on a leader or manager who is responsible for goal setting, decision-making, performance appraisals, job assignments, and job integration. Type II teams are composed of white-collar employee specialists and are managed by an individual who is also a specialist. The group depends on the manager for cohesiveness but the manager does not give day-to-day direction like a Type I manager. Type III teams are composed of employees who are cross-trained to perform the work of others and who are encouraged by the manager to make decisions. Managers remain responsible for setting goals, giving performance appraisals, and allocating resources. Type IV teams are time-limited and chartered with a specific task. The team may have a leader, but the team sets its own norms and goals. Once the task is finished, team members return to their previous work areas. Lastly, a Type V team is permanent and its members provide most of the leadership, make most of the decisions,
and usually determine the goals of the team. The group is responsible for a whole piece of work, is rewarded as a group, and team members often learn one another's jobs so that team tasks can be rotated. Ray and Bronstein consider the Type V teams to be "true" teams. However, it is arguable if a true team must be permanent and if tasks must be rotated between team members. As will be described later, many knowledge-based teams are composed of individuals with skills that cannot be rotated among members (Mohrman et al., 1995). Further, many project teams may have tasks which take years to complete. Thus, the extent to which a team is "permanent" may not accurately describe true teams.

These examples help illustrate the importance of power or autonomy to teams—for teams to feel empowered, they need the authority to make decisions about their work (Fisher, 1993). However, the role of management to a team is extremely important and is changed, not eliminated (Fisher, 1993), since the external leadership of teams can facilitate the ultimate success of teams (Manz & Sims, 1994). For example, external leaders can focus on boundary issues (i.e., the boundary between the team and the organization) including the communication links between the team and other organizational constituents, the training needs of employees, and the attainment of equipment and supplies to meet team goals (Sims & Manz, 1994). Thus, management is a necessary component of teams and can provide needed insights that can increase the ability of teams to meet organizational goals (Fisher, 1993).

Team Tasks

Teams may also be grouped by the tasks they perform. For example, Hackman (1990) groups teams into seven major types: top management groups, task forces,
professional support groups, performing groups, human service teams, customer service teams, and production teams. Top management groups generally consist of senior managers, who collectively set organizational directions and make decisions for the organization as a whole; task forces are formed of individuals from different jobs or parts of the organization to solve specific, nonroutine problems; professional support groups serve the organization indirectly by providing assistance to those who perform the primary task; performing groups serve the primary customers of the organization; human service teams serve individuals (e.g., hospitals, prisons); customer service teams attempt to provide quality and psychological well-being to their clients and customers; and production teams produce goods for the company.

**Single-Functional and Multi-Functional Teams**

The distinction between team type can also be understood by the organizational functions represented on teams. For example, teams can be single-functional or multi-functional if all team members perform the same or different organizational functions. Aspects of single-functional teams include team members: who work together daily and who are responsible for an entire work process; who are owners of the product or service and who share management functions; who are cross-trained on a number of work skills; who are limited to a specific work area; and who work together to resolve day-to-day problems and to improve operations (Harrington-Mackin, 1994). The assumption behind the development of functional teams is that organizational members should work together to meet their objectives and that the organizations will benefit if
team members perform within-function coordination needs instead of managers (Mohrman et al., 1995).

In contrast, multi-functional teams, are composed of individuals from different organizational functions (Mohrman et al., 1995). The value of multi-functional teams is based on the understanding that some large organizational processes are best understood when the subprocesses are viewed together (Mohrman et al., 1995). An example of a cross-functional team tasked with designing a car is to have key representatives from each function of the process (e.g., engineering, production, and marketing) throughout the design of the car and implementation of the design. Project teams, program teams, management teams, and design teams appear to be based on the same logic as cross-functional teams; i.e., to bring together important functions critical to the development of a project, a product, a service, a process design, or to the development of organizational strategies and/or determination of organizational trade-offs.

Choosing Single-Functional or Multi-Functional Teams

The decision to implement single- or multi-functional teams depends upon the goal or performance objectives of the team. For example, Mohrman et al. (1995) argued that the decision to implement single-functional or multi-functional teams depends on: the work processes; the nature of the work; and the levels at which cross-functional coordination is needed by the organization. For example, teams can be tasked to integrate work or to perform the core transformation processes of the organization (e.g., production teams). Integrating teams: are formed so that work across different parts of the organization fit together; are generally participants in a common organizational process;
have a shared goal in coordinating the efforts of a shared focus; and often provide coordination and direction to the units being integrated. Management teams are a special example of integrating teams, because management team members integrate the efforts of their departmental subunits, or at a higher level, the departments themselves.

Multi-Skilling

Another important aspect of teams is multi-skilling. Klein (1994) argued that multi-skilling refers to the ability of team members to learn the variety of job functions performed by the team and depends upon the performance objectives and design of the team. For example, Klein proposed that three factors help structure the work of a team so that it meets specific objectives: (1) functional tasks; (2) depth of expertise; and (3) managerial/administrative activities. Functional tasks include the activities or tasks necessary to produce outputs. Managerial and administrative activities might determine the structure of the team depending upon the need of the team for staffing, budgeting, and scheduling tasks. Depth of expertise includes the types and amounts of knowledge needed to perform either the functional tasks or the managerial and administrative activities. In terms of choosing a single-functional or multi-functional team, if the task is multi-functional, then team members should represent the multiple functions of the task. However, multi-functional teams are not always suitable for multi-skilling (Mohrman et al., 1995).

Further, Klein (1994) argued that key factors in determining whether a team can become multi-skilled are training costs and the desire of team members to become multi-skilled. Whereas multi-skilling is attractive to management, since multi-skilling
increases the flexibility of a team in performing tasks and increases labor productivity, multi-skilling is expensive (i.e., the training costs for multi-skilling can be prohibitively expensive and may not be necessary to meet organizational goals) and can disrupt the "rhythm" of task performance. For example, task performance can decrease if rotation of work tasks are too frequent, since team members may not have the time to learn proficient task performance. On the other hand, infrequent task rotation can decrease the efficiency of a team, since team members must relearn task performance. Additionally, training costs can dramatically increase if tasks are rotated too often (Klein, 1994), since some work tasks require large investments in training and education to perform adequately (Mohrman et al., 1995). This suggests that for some group tasks, multi-skilling may be inappropriate (Mohrman et al., 1995). For example, knowledge work teams (discussed below) are often inappropriate for multi-skilling (Mohrman et al., 1995).

Duration of Teams

Teams may also be distinguished by the amount of time they exist. An example is a temporary team, which might be formed in response to the development of a bid or a proposal for an important customer. This distinction is important as permanent teams can be managed through the normal organizational framework for goal setting, performance evaluation, and rewards, whereas temporary teams cannot (Mohrman et al., 1995).

Knowledge Work Teams and Production Teams

The last difference between types of teams discussed in this paper is the distinction between production- and knowledge-based work teams. The distinction
between knowledge- and production-based settings is important here, because the major goal of this paper is to identify systems that support team-based organizations and employee collaboration. Hence, the identification of key differences between knowledge- and production-based settings may aid in understanding systems that support work teams. **Production-Based Settings Defined**

Production-based settings are defined as work areas where inputs, work processes, and outputs are certain, routine, and rarely change. Further, performance of work functions in production-based settings may not require a great deal of investment in time and training to perform effectively. In this sense production-based settings are not necessarily restricted to blue-collar workers or manufacturing settings and can include white-collar workers as long as inputs, work processes, and outputs are certain, routine, and rarely change.

**Knowledge-Based Settings Defined**

Knowledge-based settings are defined as work areas where the inputs, work processes, and outputs are uncertain, nonroutine, and often change. Further, performance of work functions in knowledge-based settings require a great deal of skill and training to perform adequately. Similar to production-based settings, knowledge-based settings are not necessarily restricted to white-collar workers and can include blue-collar workers as long as inputs, work processes, and outputs are uncertain, nonroutine, and often change.

Admittedly, the criteria used to differentiate production- and knowledge-based work settings are somewhat arbitrary, particularly since most job functions are composed
of different work processes (Purser & Montuori, 1995). Additional differences between production- and knowledge-based work settings are discussed below.

**Knowledge defined.** For the purposes of this paper, knowledge is defined using Purser and Pasmore’s (1992) criteria. Purser and Pasmore classified knowledge into five distinct areas: (1) facts, which are independently verifiable and lasting truths; (2) models, which describe the detectable cause and effect relationships between facts; (3) schemas, which are mental structures that guide an individual’s thought processes and are normally based on firsthand or vicarious experience; (4) intuitions, which are speculations concerning facts, relationships or future events and are utilized when schemas are unavailable; and (5) tacit knowledge, which are unexplainable yet stable aspects of our perception of the environment or our preference toward the environment. Thus, knowledge can be defined as "...our collection of facts, models, concepts, ideas and intuitions that shape our decision" or "...any activity that helps to remove uncertainty from a relevant decision or course of action" (pp. 40 - 41). Purser and Pasmore also argued that the purpose of knowledge work is to develop knowledge from what is unknown or only partially understood, and that the outcomes of knowledge work are usually not facts (Purser & Pasmore, 1992).

**The importance of knowledge work.** Before key differences between production- and knowledge-based teams are discussed, it is important to note how knowledge-based work teams benefit organizations. For example, some authors argued that knowledge-based work teams are critical mechanisms to capture learning and integrate knowledge work (McDermott, 1995; Mohrman et al., 1995).
According to McDermott (1995), in most settings, knowledge work today can be compared to cottage crafts in the 1800s. Knowledge work is usually performed by individuals—not teams—and is often regarded as something stored in the individual that possesses the knowledge. Traditional project management generally places similarly skilled experts into functional teams, which maintains the boundaries between disciplines. (Note the use of the classical management principle of departmentalization.)

Even in teams, however, the actual work is usually performed by individuals. Team meetings focus on the exchange of expertise and information, the discussion of projects and problems, and the review of budgets. Since functional departments are usually responsible for the allocation of resources and need to make the best use of their personnel, critical resources are usually not applied to the project until absolutely required.

Further, McDermott (1995) argued that the use of functional knowledge work teams can result in severe integration problems. For example, if problems arise, meetings with other functional specialists may have to be scheduled, often resulting in delays. Even then, due to limited resources, individuals may not be available to attend meetings. Additionally, functional specialists may not see the work of other team members until their work is completed. The work involved in the product is invisible, and the problems, underlying assumptions, and the methods in which the problem was framed, is not shared.

To overcome integration problems between functional specialties, some authors argued that multi-functional teams can be used as a mechanism for integrating the work of professional knowledge workers (McDermott, 1995; Mohrman et al., 1995). Rather
than throwing work "over the wall" to the next function, knowledge work teams allow workers to view other team members' work, build on others' ideas, and develop accumulating knowledge that is accessible by all team members (McDermott, 1995). Further, teams are a likely method of integrating knowledge work, a major challenge facing organizations today, and are useful as a forum to discuss task interdependencies and resolve trade-offs between perspectives (Mohrman et al., 1995).

**The basis for organizing knowledge-based work teams.** Given the usefulness of knowledge work teams as integrating and learning mechanisms (McDermott, 1995; Mohrman et al., 1995), many organizations are using teams in production settings as models for organizing knowledge work teams (Mohrman et al., 1995). However, production-based work teams and knowledge-based work teams appear to function on different types of logic (Mohrman et al., 1995). Key differences exist between knowledge work and other types of work (Pava, 1986), and the major theoretical basis for production-based work teams, sociotechnical systems theory, appears to need modification for use with knowledge based work team (Fox, 1995; Pava, 1986; Purser & Pasmore, 1992; Purser & Montuori, 1995).

To better understand differences between knowledge- and production-based work, the following section briefly discusses the relationship between knowledge work, white-collar work, and blue-collar work. This is important, because knowledge work is not the same as white-collar work (Beruvides, Omachonu, & Sumanth, 1988), and the following examples help illustrate the concept that most jobs are a combination of different work processes (Purser & Montuori, 1995).
Differences Between Knowledge Work, White-Collar, and Blue-Collar Work

Beruvides, et al. (1989) offer a method of classifying work tasks on a continuum from knowledge work, blue-collar, and white-collar work. Figure 1 illustrates this continuum.

From Figure 1 it can be seen that in addition to classifying knowledge work separate from blue- and white-collar work, all three types of work intersect. Examples of "pure" types of work are a dock-worker (blue-collar), a receptionist (white-collar), and a researcher (knowledge work). An example of a blue-collar knowledge worker includes a highly skilled plumber performing a new type of repair. He or she would use knowledge of previous repair work and knowledge about available tools and repair materials to develop a new solution to the current problem. An example of a knowledge worker
performing white-collar work is a researcher answering incoming phone calls so the secretary can take the afternoon off. Further, a blue-collar worker could perform nothing but knowledge work if many of the routine job tasks are performed by machinery. His or her job, then, could include the application of highly specialized skills in order to solve nonroutine problems.

Beruvides et al. (1989) suggest that it is a gross simplification to assume that knowledge work is white-collar work--most jobs appear to be a combination of different work processes (Purser & Montuori, 1995). Further, the classification of work offered by Beruvides et al. has application to teams, since team design must account for knowledge work needs and develop leadership roles to meet the demands of knowledge work (see integration mechanisms below) (Mohrman et al., 1995). To facilitate the discussion of differences between production- and knowledge-based work teams, the next section assumes that production-based teams are composed entirely of blue- or white-collar workers, whereas knowledge-based teams are composed entirely of knowledge workers.

The next section of this paper discusses differences between knowledge- and production-based work in terms of the "tools" of knowledge work (knowledge), the relationship between organizations and knowledge workers, the role of variances in knowledge, the roles of knowledge and production workers, nonlinear work processes, multiple and interdependent conversion processes, nonsequential conversion flow, individualistic professionalism, and cross-training. This section concludes by discussing sociotechnical systems theory and a modification of sociotechnical systems theory for knowledge work.
Technology

One difference between knowledge- and production-based settings is the different technology used by knowledge and production workers. Whereas the primary technology used by knowledge workers is knowledge, production workers use physical technologies (Pasmore, 1988). For example, knowledge work is usually performed by highly trained and highly educated individuals (e.g., researchers, physicists, engineers, marketers, etc.) with specialized knowledge sets (Mohrman et al., 1995). Knowledge workers use this knowledge as the material for transforming inputs into outputs and for the creation of new knowledge (Purser & Pasmore, 1992). Production-based settings are characterized by physical technology (Pasmore, 1988), such as computer-aided design, robotics, manufacturing and control systems, and automated material handling systems (Gunn, 1987).

Organizational Differences between Production-Based and Knowledge-Based Workers

Because knowledge workers use knowledge as their main technology, organizations appear to have different relationships with knowledge workers compared to production workers. Whereas managers can evaluate the performance of a production employee by visually monitoring his or her performance or the product of his or her labor, with knowledge workers, this is not possible, since much of the employee's work may occur in his or her head (Purser & Pasmore, 1992). As a result, the availability of knowledge, variances (unanticipated or uncontrolled problems), and the role knowledge workers have in organizations, appear different for knowledge workers compared to other types of work (Pasmore, 1988).
Availability of knowledge and motivation. For instance, Pasmore (1988) argued that knowledge workers can choose to make their knowledge available to organizations, or they can deny this knowledge. Although companies may use psychological contracts to formalize agreements between the organization and its employees, knowledge workers can still withhold valuable information. Thus, organizations may have difficulty evaluating the performance and may be more dependent upon a "trust" relationship, with knowledge workers. Constant negotiation is required to keep knowledge worker's committed to the success of organizational goals as conditions change. This suggests that organizations might realize better productivity from knowledge workers by meeting their psychological needs (Purser & Pasmore, 1992).

For example, organizations can motivate knowledge workers by: (1) creating individualized career development opportunities; (2) providing "intellectual space" for knowledge workers; (3) designing reward systems that encourage a knowledge worker's talents; (4) paying close attention to the unique characteristics and values of knowledge workers; (5) maintaining the meaningfulness and challenge of work processes; (6) developing "career-sensitive" human resource systems; and (7) developing appropriate performance appraisal systems (Von Glinow, 1988). These criteria may be useful in assessing organizational support systems for collaborative work systems, and are discussed in more detail below.

Unobservable variances. Whereas variances are less obvious in knowledge work, in production-based settings, variances are more readily identified (Pasmore, 1988). Purser and Pasmore (1992) argued that variances in knowledge work are difficult to
detect, because they occur in individuals. This makes variances difficult to recognize and track to their source. Further, Purser and Pasmore state that variances may have little use in knowledge-based systems, because steady-states—the ability of a system to minimize disruptions and return the organism or system to normal (Katz & Kahn, 1966, 1978)—do not apply to knowledge-based systems. Unexpected events might actually stimulate a knowledge-based project (Purser & Pasmore, 1992).

As a consequence, Purser and Pasmore (1992) differentiate between method variances—variances for linear (a linear work process is one where the steps in the process can be listed in sequential order) (Pasmore, 1988) work—and variances for knowledge-based systems. A method variance is defined as errors that are visible and repetitive. Variances in knowledge work are defined as "events, conditions, or occurrences that are uncertainty-increasing in their effect" (p. 54) and represent barriers that inhibit learning. For instance, Pasmore and Gurley (1990) offer a number of variances that can decrease task performance in knowledge-based settings, including: (1) insufficient knowledge to perform tasks; (2) inability to use knowledge that already exists within the organization; (3) insufficient cooperation between individuals who hold relevant knowledge; (4) exclusion of individuals with important knowledge when discussing issues or problems; (5) inclusion of the wrong individuals when discussing issues or problems; (6) lack of key discussions on important issues or problems; (7) insufficient clarity in goals or priorities when completing projects; (8) inappropriate time frames, either too long or too short, for completing projects (e.g., a deadline that is set too far into the future may not focus individual's attention on the project); (9) insufficient
clarity or nonexistent procedures for completing projects (e.g., a procedure which
determines who should be involved in a decision); (10) inattention to customer needs or
external organizational demands when completing projects (e.g., customer needs are not
assessed before the design stage of a project); and (11) overly structured and bureaucratic
procedures (e.g., trivial paperwork or too many rules and regulations). The variances in
knowledge work offered by Pasmore and Gurley may serve as useful criteria in
determining organizational systems that support collaborative work systems.

Role differences between production-based and knowledge-based workers.

Another distinction between knowledge- and production-based work settings is that
knowledge-based work may serve a different organizational function. The organizational
value of a production-based setting lies in its ability to produce goods (Pasmore, 1988).
For production settings to perform this function, knowledge is secured and then made
available in the form of physical technologies (Pasmore, 1988). For example, a
manufacturer may produce goods through a linear system of production techniques and
equipment (e.g., an automobile manufacturer).

In knowledge-based settings, however, the function or purpose of work is
different. Knowledge workers often create technology (Mohrman, Cohen, & Mohrman,
1995; Pasmore, 1988), develop new processes for integrating knowledge (Mohrman et
al., 1995), and apply knowledge (Pasmore, 1988). In the example above, the
development of new technologies and new production techniques into a system capable
of manufacturing automobiles is knowledge work. The different function of knowledge
work may give knowledge workers more status and power in corporations (e.g., Pava, 1986; Purser & Montuori, 1995; Von Glinow, 1988).

**Work Process Differences of Production-Based and Knowledge-Based Work Teams**

Another way to distinguish between production-and knowledge-based work settings is by linear and nonlinear tasks. Many work processes, particularly in manufacturing settings, are linear. The processes that make up the overall task (the steps along the process of converting inputs into outputs) can generally be programmed into a sequential order (Pava, 1986). For example, in an ice-cream manufacturing plant, the subprocesses of selecting ingredients, mixing the ingredients, and then packaging the results, is linear. The ability to classify linear work into predictable steps makes linear work well understood, easily proceduralized, and routine (Mohrman et al., 1995).

However, in knowledge work, the results of the work rarely depend on linear conversion processes. Nonlinear work processes cannot be listed in sequential order (Pasmore, 1988), which makes the process of task performance nonroutine. Knowledge work is usually poorly structured, and the nature of the problem, the inputs and outputs, are erratic (Pava, 1986). The absence of clear beginnings or ends and the pooled interdependence of the processes makes exhaustive, stepwise problem solving expensive, and sometimes impossible (Pava, 1986). In the ice-cream example, what if customer demands are pressuring the company into developing a new product line of low-fat ice-cream? To develop a new product, new knowledge must be created. Different ingredients would have to be purchased, the combination of these ingredients would have to be varied, and the product would have to be evaluated. The nonroutine nature of this
example is illustrated by the problems that could occur during this process. For instance, the ingredients could result in a product that tastes great but will not freeze correctly or the texture of the new product could be entirely unlike "normal" ice-cream. Thus, the cause-effect relationships of knowledge work are often poorly understood (Mohrman et al., 1995).

Control Mechanisms for Production-Based and Knowledge-Based Work Teams

An additional difference between knowledge- and production-based work settings is the extent to which organizations can control the work processes and individuals that work in the different settings. Control systems help develop organizational capabilities by guiding individuals' behavior toward organizational objectives (Ittner & Kogut, 1995). Control mechanisms, such as classical management principles, are choices (Galbraith, 1977) that become rules, policies, procedures, and measurements which control behavior (Ittner & Kogut, 1995). Control mechanisms include: (1) personal supervision; (2) job descriptions; (3) work rules; (4) standard operating procedures; (5) performance appraisals; (6) budgets; (7) incentive compensation schemes; (8) planning systems; (9) and informal norms and expectations (Ittner & Kogut, 1995). The control systems described by Ittner and Kogut (1995) may be helpful in identifying important systems that support collaborative work behaviors.

Control over creativity. For knowledge work, however, control systems often inhibit creativity (Amabile, 1990) which is important to generating knowledge (Purser & Paskmore, 1992). For example, extrinsic factors that can inhibit the ability of individuals to perform creatively include: (1) evaluation; (2) supervision (i.e., being watched); (3)
rewarding creativity on a contract basis; (4) competition; and (5) restricted choice (Amabile, 1990). These factors suggest that managers must be sensitive to the needs of workers who create knowledge, and that managers must develop support systems that do not inhibit the creation of knowledge.

Further, control mechanisms may be easier to implement in production-based settings, since linear work is well understood, easily proceduralized, and routine (Mohrman et al., 1995). For knowledge-based work, however, managers must be much more sensitive to the knowledge-creating process, since creation of knowledge cannot be demanded (Purser & Pasmore, 1992) and traditional control mechanisms may not be effective (e.g., Amabile, 1990).

Control over performance. Additionally, Pasmore and Gurley (1990) suggested that control over knowledge work is difficult in other ways. For example, performance may be evaluated differently in production- and knowledge-based settings. Whereas production-based settings may evaluate performance in terms of micro-measurements (e.g., errors per hundreds, waste, or quality), knowledge-based settings may be more concerned with the final result. Production-based settings often measure time in minutes; knowledge-based settings may measure time in quarters or even years. Comparing the performance of knowledge workers may not be possible, since the problems and the manner in which knowledge-workers address problems may not be comparable (Shapero, 1985).

Control over decisions. Further, Pasmore and Gurley (1990) proposed that decisions are often made differently in production-based settings, since tight
specifications exist, past experience is directly applicable, and individuals with authority are often granted decision-making power. As individuals in production-based settings gain expertise and move up the organizational hierarchy, decisions may be made in a "top-down" manner and decision acceptance and quality may remain acceptable.

However, in knowledge-based settings, previous knowledge may not be applicable, and the outputs from multiple projects must fit together (e.g., the parts of an automobile engine might be designed by separate teams and must fit together during assembly) before manufacturing is involved. Few rules exist to help structure the knowledge production process, and expertise is often distributed throughout the organization. In contrast to linear production systems, where decisions can be made at the top of the organization, in knowledge-based settings, consensus must be reached among workers on the project, who often know more about the work than their supervisors.

Work processes and control. Finally, the linear nature of production-based settings--the steps in the process can be listed in sequential order--may make the contributions of workers easier to identify, since linear work processes can facilitate the identification of production process sequences and can make employee contributions in the system more predictable. For instance, an assembly line employee would place a right front fender on an automobile the same way each time. However, for knowledge work settings, identification of the progression of steps in the knowledge work process may be difficult or impossible. For example, the knowledge work process of developing an auto production line would be difficult to classify in linear steps, because the most effective arrangement of the new technologies and production techniques is uncertain. If system
development is performed by several individuals (e.g., a systems engineer, management, and an expert on production technology) the contributions of each member would be difficult to track: suggestions and contributions may be based on the previous work of another individual, so that the end product is based on a collaborative effort.

**Multiple, Concurrent Conversion Processes and Nonsequential Conversion Flows**

Pava (1986) argued that two differences between nonlinear work and linear work include multiple and interdependent conversion (work function) processes (i.e., uncertainty in how and when to perform related, multiple job functions) and nonsequential conversion flows (i.e., the process of completing work depends on the form of other conversion processes that can change over time). However, a potential criticism of Pava is that the two concepts may be more easily understood when referred to as four, interrelated concepts. For example, multiple and interdependent conversion processes may refer to multiple job functions and complexity and uncertainty performing job functions. Nonsequential conversion flows may refer to uncertainty performing job functions, change, and interdependence. These are discussed in detail below.

**Multiple job functions and complexity.** Pava (1986) argued that nonlinear work is characterized by multiple and interdependent conversion processes, which refers, in part, to the multiple job functions performed by a team in a nonlinear work system. For instance, a software engineering team may, in a single day, write software code, manage resources with other teams, and discuss the development of new products. Further, Pava argued that multiple and interdependent conversion processes is affected by the complexity of the nonlinear system, since complexity in the nonlinear system makes
performance of job functions uncertain. This is discussed further in the next section. Thus, multiple and interdependent conversion processes may refer to the complexity of knowledge-work systems and to the many different conversion flows (job functions) that address the complexity of the nonlinear system.

Uncertainty performing job functions. Further, Pava (1986) argued that nonlinear tasks have nonsequential conversion flows (i.e., the method of performing nonlinear tasks cannot be determined at the onset). Galbraith (1977) defines uncertainty as "...the difference between the amount of information required to perform the task and the amount of information already possessed by the organization" (p. 36-37). For instance, with the ice-cream example, what are the inputs and outputs that determine how to best market the new product? What distributors and stores will provide shelf-space for the new product? What test-sites should be used to evaluate the marketability of the product? What form of advertising should be used and what should the advertisements emphasize? Taking these factors into account, when will the company know if the product is ready for national marketing and distribution? Thus, complexity is increased, since the nature of the inputs and outputs are often imprecise and poorly understood. The uncertain nature of inputs and outputs increases the uncertainty of performing job functions (Pava, 1986). This makes knowledge work emergent rather than programmed, uncertain rather than well understood, and dynamic rather than static (Mohrman et al., 1995).

Further, Pava (1986) argued that uncertainty affects multiple, concurrent conversion processes (multiple job functions). However, the example given by Pava
(1986) appears to blend multiple, concurrent conversion processes with nonsequential conversion flows. Thus, Pava's concepts of multiple, concurrent conversion processes and nonsequential conversion flows are discussed below in terms of interdependence and change.

**Interdependence.** Here, interdependence refers to the dependent relationships between multiple subprocesses of a larger process. For instance, in the ice-cream example above, the process of marketing a new brand of ice-cream was broken down into potential distributors, test-sites, advertising, and target group needs. These subprocesses are interdependent, in that the final form of one subprocess depends, at least in part, upon the final form of the other subprocesses. For example, the final form of advertising may not be determined until a target group is chosen, and test-sites may not be chosen until target groups and advertising are determined. Thus, the interdependent nature of subprocesses can increase the uncertainty of performing multiple job functions, since a job function may have to be performed if a subprocess reaches a critical state (see the example in the next paragraph).

**Change.** Another concept referred to by Pava (1986) is change, in that processes that appear "certain" at one time can become uncertain later in the process as new information is acquired (Pava, 1986). Further, the concept of change may extend Galbraith's (1977) definition of uncertainty—"the difference between the amount of information required to perform the task and the amount of information already possessed by the organization" (p. 36-37)—since new information may alter how previous information is viewed. The complexity of performing job functions in the nonlinear
system is increased, because new information may offer new possibilities for performing work. Using the ice-cream example again, suppose that initial results suggest the products are marketable. Distributors are interested in the product, sufficient shelf-space has been negotiated with stores, large-scale production has begun, and the product is an instant success. However, two problems are reducing the potential profitability of the product. Individuals in the Southwestern U.S. seem to prefer the chocolate fudge-brownie low-fat ice-cream over other types, and the supplier of a key ingredient for the product has just declared bankruptcy. Further, delivery of chocolate fudge-brownie requires a special distributor as the product melts quickly and the distributor has limited capacity for distribution in the Southwest. This forces the company to "backtrack" and to resolve questions that once were certain. Will ingredients from a new supplier significantly affect the final product? Can the new supplier meet the company's just-in-time production process? Can a new distributor be found? Can we change our current manufacturing schedule to meet the demand for chocolate fudge-brownie ice-cream? Thus, in nonlinear work, changing information in one component of a work function may force workers to "back-up" and re-address questions that were once certain. Finally, the concepts of multiple job functions, complexity, change, and uncertainty, appear to be interdependent. A knowledge-worker's job function for a particular day may be uncertain, since change is interdependent with uncertainty (change often creates uncertainty) and the job function of a knowledge worker is interdependent with uncertainty (performance of a job function may depend on whether job parameters are certain). For instance, in the ice-cream example above, the team may be forced to
resolve the uncertainty of finding a new supplier of ingredients immediately and wait on other important job functions.

**Individualistic Professionalism**

Another feature of knowledge work identified by Pava (1986) is the individualistic professionalism of knowledge workers. Since knowledge workers are often highly educated specialists, their expertise tends to affect how they view their work roles and reward systems. Knowledge workers may become accustomed to wielding authority, and their expectations of rewards, career advancement, and work activities, may emphasize individual contributions. Additionally, the expertise available to knowledge workers may make it difficult for them to relate to other experts. Each expert has a distinct body of knowledge to draw from, will attend to different aspects of a problem, and will have different preferences (Mohrman et al., 1995). When discussing issues on teams, individualistic professionalism challenges the ability of knowledge workers to transcend their specialized views and understand elements in other knowledge workers' disciplines (Mohrman et al., 1995).

**Depth of Knowledge**

Another key difference between knowledge work and other types of work is that performance of knowledge work tasks often require extensively trained specialists (Pava, 1986; Mohrman et al., 1995). More complex functions or tasks generally require more training, education, and a larger knowledge base compared to less complex functions or tasks. Some job functions, such as engineering, take years of education and training to
perform adequately. Other job functions, such as the operation of machinery, may require less education and training.

Thus, work roles can be characterized by the depth and breadth of the knowledge necessary to perform a job role (Klein, 1994). Whereas, complex job functions may require greater knowledge depth to adequately perform a job function, less complex job functions may require less knowledge depth. Further, if the total knowledge or learning available to an individual is viewed as finite, individuals may only be able to learn several, "deep" skills. In production-based settings, where job functions often require moderately deep skills, the individual may have additional capacity to learn additional jobs (breadth of knowledge) of similar depth.

Multi-Skilling in Production-Based and Knowledge-Based Work Teams

An additional difference between production- and knowledge-based work settings is the general inability of knowledge-based work team members to become multi-skilled (i.e., perform multiple job functions). Mohrman et al. (1995) for example, argued that production work is often routine and requires skills in the low to moderate level. Thus, production-based work team job functions are often designed so that jobs can be rotated among members. Job rotation (multi-skilling) provides for a variety of tasks among workers, creates job flexibility, and encourages the development of diverse skills among team members. These factors result in a sense of control by work teams members, enriches their work, and creates generalists of team members. For knowledge-based work teams, however, it is often impossible to make generalists of all team members. Knowledge work often requires deep skills in an area and learning deep multiple skills
may not be possible. In some cases, where skills are unavailable to teams and too expensive to obtain, teams might be able to hire expert consultants or use organizational functional support teams to obtain needed skills (Klein, 1994).

**Sociotechnical Systems Theory**

The last difference between production- and knowledge-based work settings discussed in this paper is the theoretical basis for organizing teams. For implementing teams in production-based settings, the most commonly used theoretical model appears to be sociotechnical systems theory (e.g., Pasmore, 1988). Sociotechnical systems theory, however, appears to have serious shortcomings, or at best, needs modification, when applied to knowledge-based work teams (Fox, 1995; Mohrman, Cohen, & Mohrman, 1995; Pava, 1986; Purser & Pasmore, 1992). The following discusses several characteristics of sociotechnical systems theory, including: (1) open systems theory; (2) the consequences of viewing organizations as open systems; (3) an organization's environment, technical system, and social system; (4) joint optimization; (5) propositions of sociotechnical systems theory; and (5) principles of sociotechnical systems theory. Sociotechnical systems theory is then reexamined in terms of changes which way make the theory more applicable to knowledge-based work teams.

**Organizations as Open Systems**

At one time, social scientists often conceptualized organizations as "closed" systems (Katz & Kahn, 1966; 1978; Trist, 1959). A system is defined as an independent framework in which the parts of the system are organized (Cummings & Srivastva, 1977). In the closed system conceptualization, organizations are viewed in terms of their internal
structures without reference to the external environment (Trist, 1959). Closed systems: (1) do not receive inputs from the environment; (2) are unable to maintain steady states; and (3) tend to reach an equilibrium where the system is unorganized and unable to perform work (Cummings & Srivastva, 1977).

Trist (1959) argued, however, that organizations appear to possess many characteristics of "open" systems with a social and a technological component. In the open systems conceptualization, organizations attempt to develop internal structures that maintain an internal equilibrium (e.g., the capacity to continue production) even though the external environment is changing (Trist, 1959). By maintaining input from the environment through exchanges and self-regulating activities, open systems maintain relatively high states of energy and complexity and maintain work levels despite fluctuations in the environment (Cummings & Srivastva, 1977). The system's boundary is open or closed to environmental demands to the extent that the boundary of the system is permeable to inputs of information, raw materials, and energy (Cummings & Srivastva, 1977).

Further, Trist (1959) argued that maintaining internal equilibrium depends on the organization's ability to regulate internal and external exchanges. Internal exchanges are developed: (1) by applying the necessary materials (e.g., raw supplies, machines, tools) to production; (2) by maintaining a work force able to develop systems that process the materials; and (3) by organizational supports that assist the firm's work force in a rational and predictable manner. External exchanges depend on markets for products and inputs, including labor, technology, and materials.
Additionally, Trist (1959) argued that for organizations to maintain its current structure and internal equilibrium with outputs, the organization must maintain flexibility of its technical production systems and develop a distinctive competence so that markets are receptive to the organization's products. An organization maintains internal equilibrium in respect to inputs, labor or materials, by its ability to tolerate variation through its technical organization. Thus, two significant characteristics of open systems theory and organizations are: (1) no one-to-one relationship exists between inputs and outputs, since the organization is, to an extent, self-regulating; and (2) technology plays a major role in determining the ability of the organization to self-regulate and functions as a boundary between the social system as it attempts to meet the goals of the organization and the constraints of the external environment. Thus, since technology plays a mediating role in organizations, instead of viewing organizations only in terms of a social system, the open systems concept is referred to as the sociotechnical system (Trist, 1959). Cummings and Srivastva (1977) define a sociotechnical system as "a nonrandom distribution of social and technological components that coact in physical space-time for a specified purpose" (p. 60).

Characteristics of Open Systems

Katz and Kahn (1978) offer 10 characteristics of open systems. One, the system imports energy from the external environment. Two, the throughput of the system transforms the inputs in some way. Three, the system outputs or exports some type of product into the environment. Four, the system experiences a cycle of events (e.g., sales from products or services are used to purchase new raw materials or labor from a
continuation of the activities). Five, the system experiences negative entropy (i.e., by acquiring energy, an organization will reduce the tendency toward disorganization). Six, the system receives information input, negative feedback, and has some type of coding process. For instance, inputs can also consist of information. Information that consists of negative feedback, provides information to the system and allows it to correct or return to "normal" functioning. However, some type of coding process must be used to simplify information into a category for use by the system. Seven, the system experiences a steady state and dynamic homeostasis. Steady state refers to the constancy of energy exchange in a system so that disruptions in the system are countered with energy which keeps the system steady, or constant. Homeostasis refers to the tendency of systems to move toward growth and expansion as they counter entropy. Eight, the system experiences differentiation, in that simple patterns or functions are replaced or elaborated with more specialized functions or patterns. Nine, the system has integration and coordination mechanisms that counter differentiation processes and bring the system together for unified functioning. The last open systems principle, equalfinality, refers to the ability of a system to reach a final state despite different initial conditions or by the use of a final path. The components of open systems theory help to understand organizational patterns through the cycles of inputs, transformation processes, outputs, and reviewed inputs. Open systems theory also develops an understanding of how organizations react to their environment and the feedback processes that allow organizations to survive.
Consequences of Viewing Organizations as Open Systems

Cummings and Srivastva (1977) argued that there are four consequences to viewing an organization as an open system. First, to understand a open system, it is necessary to understand the nature of the system and its interdependence with the environment. In contrast, behavior in an closed system is explained in terms of internal structures only. Second, variances are essential to the self-regulating properties of open systems, since variability is needed to adjust to the environment and maintain growth towards greater complexity and heterogeneity. In closed systems, variances are disruptive to the functioning of the system and must be controlled, because the system cannot import energy or develop into higher levels of complexity. Whereas open systems can develop into additional states, closed systems tend to reach a state to where they can no longer work. Third, since open systems receive multiple types of feedback from the environment, open systems are continually faced with uncertainty concerning appropriate behavior. Thus, to develop more certain environmental states, the system must actively seek out adequate information from the environment and influence the environment. In closed systems, the focus is based on the certainty inherent in systems that are unaffected by the environment. Finally, open systems can produced results in a variety of ways by modifying their structures, since no best way exists to structure an outcome as the effectiveness of structures depends upon the specific environmental conditions. In contrast, the closed system perspective, based on high degrees of certainty and rationality within the system and minimal environmental influence, focuses on the best way of structuring the system to produce an outcome.
Organizations and their Environments

As described above, the open systems perspective emphasizes the relationship between the organization and its environment (Cummings & Srivastva, 1977; Katz & Kahn, 1966, 1978; Trist, 1959). Organizational environments can be defined as a series of systems, examples of which include governmental systems, economics systems, cultural systems, technological systems, transportation systems, and trade and monetary systems (Pasmore, 1988). Further, Pasmore argued that the environment plays several roles in relationship to an organization. On one hand, the environment provides an organization with resources needed for survival, and on the other hand, acts as a judge in determining if an organization is successful. Thus, the environment must be taken into account so that key technologies are buffered from environmental trends that might threaten the organization's survival.

Environmental Effects On Organizations

Moreover, environments appear to vary in terms of their effects upon organizations (Emery & Trist, 1965). Emery and Trist (1965) for example, argued that environments can be classified into four types: (1) a placid, randomizing environment where noxiants (goods and bads) are more or less unchanging and randomly distributed; (2) a placid, clustered environment where noxiants are randomly distributed and are banded together in certain ways; (3) a disturbed and reactive environment consisting of the placid, clustered environment in addition to other organizations that become dominant characteristics of the environment; and (4) turbulent fields, the most complicated environment. Turbulent fields contain dynamic processes that arise from the field itself.
and cause significant problems for the organization. Further, three trends contribute to the emergence of dynamic field forces: (1) the challenge of competing with similar organizations produces reactions from the environment; (2) the increasing interdependence between the economy and other aspects of society produce legislation and regulation; and (3) an increasing organizational reliance on research to maintain competitiveness. Evidence suggests that the current economic environment is the most turbulent seen in modern history (e.g., Herman, 1995; Doeringer et al., 1991). Further, environmental turbulence create organization instability (Emery & Trist, 1965) and drive organizations to alter their market place strategies and organizational forms (Miles & Snow, 1994). To counter turbulent fields, Emery and Trist suggest that the organization develop values that have significant meaning for all its members and that guide individuals during times of uncertainty. Galbraith (1994) argued that organizations must develop the organizational capabilities through the development of their processes and people.

**How Organizations Interact with their Environments**

Cummings and Srivastva (1977) argued that five properties explain how systems interact with their environments: (1) the import-conversion-export cycle; (2) boundaries; (3) steady states; (4) regulation and control; and (5) equifinality. These properties help to explain how open systems maintain their identity and adapt to changing environments. Further, the five properties described below help illustrate many principles used to organize production-based systems. Later, the same principles are compared to the needs of knowledge-based systems.
Systems and the Import-Conversion-Export Cycle. Figure 2 illustrates the four-step cycle by which a system imports materials from the environment, converts these materials into products, exports products to the environment, and exchanges outputs for further inputs.

Figure 2. Cummings and Srivastva's (1977) Import-Conversion-Export Cycle.

Cummings and Srivastva (1977) proposed that an important heuristic to understanding the value of the import-conversion-export cycle is the concept of the primary task. Identification of the primary task determines: (1) critical processes necessary for organizational survival; (2) the dominant import-conversion-export cycle; (3) the social and technological components of a system; (4) the multiple activities that make up a system; (5) conflicts which may occur between the system and the environment if different parts of the system define the primary task differently; and (6) the points at which systems must interact with the environment in order to survive.

Additionally, Cummings and Srivastva (1977) argued that determination of the primary task assists in identifying the internal constraints of a system. Internal constraints
develop because completion of a primary task may depend more upon a system's technical or social components. The human and physical components set constraints on the flexibility of the system, help determine the degree to which the system can handle environmental forces and remain independent from the environment, and serve as major boundaries of the whole system (Cummings & Srivastva, 1977).

**Boundaries of systems.** Cummings and Srivastva (1977) indicated that boundaries are commonly used to express two distinct concepts: concrete and conceptual boundaries. Concrete boundaries arise from the physical and temporal aspects of a concrete object (e.g., rooms, buildings, or work area) and conceptual boundaries are used to abstractly differentiate an attribute of a concrete system (e.g., ability or intelligence). For open systems, boundaries exist to filter out environmental forces while permitting select materials to enter or leave the system.

Cummings and Srivastva (1977) also suggested that systems have concrete and conceptual internal and external boundaries. The external concrete boundary distinguishes and connects the lower level systems (e.g., social or technical systems) which comprise the entire system, protects lower level systems from the environment, and acts as a filter for materials and information. A concrete external boundary might include the walls, ceiling, and floor of a group's work area. Concrete internal boundaries serve the same function as concrete external boundaries, and might include the skin and clothing of a team member in the system. A conceptual external boundary helps to differentiate the system from its environment, and a conceptual internal boundary performs the same function for the systems of the whole system. A conceptual external
boundary might be the skill level attributed to the system as a whole, and a conceptual internal boundary might the skill level attributed to a team member or the utility of a piece of equipment within a system.

Thus, Cummings and Srivastva (1977) argued that the primary function of concrete boundaries is to regulate the exchanges between the system and its environment. The boundary, via the demands of the primary task of the system and the flexibility of the social and technological components, serves as a control in regulating imports and exports by selectively filtering materials and information. Depending on the flexibility of the social and technological components, the boundary is more or less permeable in allowing a range of environmental conditions (e.g., materials or information) to affect the system—the boundary serves as a region of control and as a regulatory function.

**Systems and steady states.** Cummings and Srivastva (1977) indicated that a steady state refers to the ability of a system to maintain its order or complexity while performing work and interacting with its environment. Order is maintained by adjustment processes in the system's components which counter environmental disruptions through adaptive mechanisms, and which restore the system, as much as is possible, to the preexisting state. For example, in a production-based setting, poor quality raw materials might increase the failure rate of the system's product. Feedback from customers, a new supplier of the raw materials, and mechanisms to ensure the quality of raw materials and the final product, could return to system to its previous status of producing high quality outputs.
Further, Cummings and Srivastva (1977) suggested that the existence of a steady state assumes that the exchange and conversion processes of the system are adequate to continue the system's survival and helps to distinguish between systems. A system incapable of maintaining a balance between internal components and the environment operates in a diminished capacity or terminates altogether. For instance, consider two production systems. System A has new equipment and modern production techniques and System B has older equipment and is based on outdated production techniques. The management of System A, noting that high quality goods are increasingly important to consumers (e.g., Toyota in the 1980s), invested the profits back into the system to improve quality and reduce unnecessary waste. System B continued to produce products in the same manner as before (e.g., General Motors in the 1980s). The exchange and conversion processes differentiate the systems, since the goods produced by System A are of higher quality than those produced by System B. Further, System B would operate in a diminished capacity, since the system exchange and conversion processes are inadequate to continue the system's survival (e.g., the decrease in market share of General Motor products in the 1980s).

Cummings and Srivastva (1977) also argued that sociotechnical systems demonstrate steady states when they are able to maintain exchanges with their environments and meet their requirements for survival and growth. Further, sociotechnical systems utilize two related sets of variables to maintain steady states: import and export variables and conversion variables. Examples of import and export variables include the frequency, costs, rates, and types of imports and exports.
Conversion variables pertain to those conditions that transform imports into exports and include the social and technological aspects of the system. Both the technological and the social systems must maintain steady states to maintain an overall steady state for the entire system.

The regulation and control of systems. Cummings and Srivastva (1977) indicated that regulation and control mechanisms allow open systems to maintain steady states by adjusting their components to ranges of stability required to maintain the system's survival. Through regulation and feedback mechanisms, the system compares information about the steady state to standards of stability. Should the system be functioning beyond the range of stability, adjustments are required to return to a steady state. Further, feedback mechanisms consist of two types: negative and positive feedback. Negative feedback refers to information that is used to maintain a steady state, since the information is used to dampen or negate deviations that affect stability (negative feedback returns the system to stability). Positive feedback refers to information that is used to increase deviations from a steady state and is required to move systems into higher-level conditions (positive feedback moves the system away from stability).

Moreover, Cummings and Srivastva (1977) argued that several elements, identified by cybernetics (the study of feedback control), are necessary for successful regulation of a system. These elements include: (1) steady state variables and the range of stability that determine standards of system performance; (2) a method of obtaining information about the status of steady state variables so that standards can be compared; (3) a repertoire of behavior that can be used to correct for deviations; and (4) methods
for decision-making and response that allow the system to choose and make corrective actions before the source of the disturbance changes. Systems use negative feedback and the four elements above to maintain successful regulation by adapting to their environments. However, these characteristics make several assumptions about an open system's ability to regulate and control its components.

In the first assumption, Cummings and Srivastva (1977) suggested that steady state variables are considered to be goals or intended future states. Deviations from the intended states, then, represent goal-directed behavior, since the system must make adjustments to return to preexisting states. If no deviations exist, then there is no need for adjustment or goal-directed behavior. In the second assumption, the system is assumed to need a method for monitoring outputs and behaviors if information is required to adjust inputs, a process commonly referred to as a negative feedback loop. Figure 3 illustrates a negative feedback loop.

![Negative Feedback Cycle](image)

**Figure 3.** Cummings and Srivistiva's (1977) Negative Feedback Cycle.
Examination of Figure 3 indicates that a negative feedback loop can be characterized in terms of a four-step process: (1) the input information is monitored by a comparison device; (2) the comparison device compares the information to goals and signals if adjustments are needed; (3) a decision-making system utilizes the information to develop a new set of behaviors that address discrepancies; and (4) the new information is fed back into the system (Cummings & Srivistiva, 1977). Further, Cummings and Srivistiva (1977) argued that the loop may include components inside or outside the system and has features which may reduce the effectiveness of the system. For example, there may be a time "lag" before information is returned to the system; the information received by the comparison device may be incorrect; or the "gain" or the extent of the corrective effect, may be low. Thus, there is variance in the effectiveness and ability of negative feedback to maintain steady states.

Cummings and Srivastva (1977) argued that a third assumption concerns an open system's ability to regulate and control its components is that the system must have a variety of behaviors to correct for deviations. Ashby's (1976) Law of Requisite Variety suggests that for effective regulation to occur: (1) the system must have at its disposal a variety of responses to meet disturbances in the system; and (2) of the available responses, one must exist that is effective in controlling the specific disturbance encountered by the system. Further, systems can respond to disturbances by developing a variety of internal corrective responses or by attempting to reduce the variety of disturbances in the environment. Thus, the Law of Requisite Variety suggests that systems have internal and external means to increase the system's regulatory capacity.
Cummings and Srivastva (1977) indicated that the last implication in regard to regulation and control has to do with the decision-making and implementation process of the system, both of which are dependent, in part, upon the system's environment. For example, environments that change slowly and have a reduced number of interconnections among its parts allow the system to predict changes in advance and to separate disturbances from among parts. More complex environments, however, reduce the ability of the system to anticipate changes or separate disturbances among the parts. In this case, the system may attempt to control its regulation by reducing environmental complexity.

Finally, Cummings and Srivastva (1977) argued that the four assumptions concerning an open system's ability to regulate and control its components has several implications for sociotechnical systems. First, a sociotechnical system must be able to regulate the behavior of the entire system in addition to the social and technological components of the system. Further, the regulation of multiple systems results in large demands upon the ability of the system to regulate itself. The social and technological systems require control processes suited to the dynamics of their systems and the regulatory needs of the overall system must be balanced with the needs of the social and technological components. Second, issues and difficulties may develop when determining the type of regulatory mechanisms used by a system. For instance, hierarchical control structures may be more suited to controlling simple environments and self-regulatory control structures may be more suited to meeting demands of complex environments.
Systems and equifinality. The last property Cummings and Srivastva (1977) use to describe how organizations interact with their environments, equifinality, refers to the process by which a system reaches a steady state given a variety of initial states and a variety of methods or paths to reach the steady state. Equifinality allows systems to survive and grow as open systems and maintain adaptive states, as long as the system is able to follow a variety of paths and depending upon the environmental conditions that effect the system. Equifinality is an extremely valuable concept for sociotechnical systems. The challenge is to organize a sociotechnical system so that it is capable of growing toward fully developed states and adjust to environmental conditions.

Cummings and Srivastva (1977) imply that a sociotechnical system can grow to fully developed states. However, this seems contradictory when viewed in the context of systems theory. First, the concept of a fully developed sociotechnical system suggests that the system has become a closed system. Closed systems are unable to maintain steady states and tend to become unorganized and unable to perform work. Further, fully developed system may not benefit from positive feedback, and thus, may be unable to develop into more complex forms. Since current economic trends suggest that the environment faced by organizations today is highly turbulent (e.g., Herman, 1995; Doeringer et al., 1991) can organizations afford to have sociotechnical systems that no longer grow and adapt to turbulent environments?

Another argument against the possibility of fully developed sociotechnical systems is the high rate of technological change in the current economic environment (Miles & Snow, 1994). High rates of technological change (Miles & Snow, 1994) and
the argument that social systems eventually outgrow existing technological systems (Cummings & Srivastva, 1977) may decrease the ability of sociotechnical systems to maintain steady states and become fully developed. Finally, social systems change (e.g., group members can retire, change jobs, or be promoted), which can change the ability of the social system to interact with the technological component. Thus, fully developed sociotechnical systems may be impossible. Instead, sociotechnical systems may reach temporary and static steady states, which change when the technological and social components of the system change.

Social Systems

In addition to the importance of the environment to sociotechnical systems, Trist (1959) argued that organizations contain a social component. Pasmore (1988) describes the social system as a synthesis of all the people in the organization and all that makes up their humanity, including: (1) individual attitudes, beliefs, schemas, and prejudices; (2) the psychological contracts between the organization and its employees; (3) the individual's reactions to the structures of the organization such as work arrangements and organizational policies; (4) the relationships between individuals, individuals and groups, groups and the larger organization, management and individuals, and groups and the larger organization; (5) cultures, values, experiences, intelligence, power, and motivation; and (6) emotions, such as love, charity, joy, pride, devotion, hate, greed, and jealousy.

In a synthesis of research covering 22 years, Fox (1995) identified the important features of a social system. For example, work roles should be organized so that work is
performed cooperatively and not competitively; work roles should be organized so that a worker can identify an end result as their responsibility or the responsibility of another worker; workers jointly determine how support services should be allocated, or support services are provided in a fair manner to all workers; the degree to which key variances (variances that significantly affect production) are controlled by the worker, manager, or supervisor and the extent to which key variances are transferred across the social system boundary; the extent to which interdependencies among workers provide for the accomplishment of a task or the continuity of a task if an individual in the social system should fail; the perception of workers in their role and how dependency, pay, self-worth, trust, subordination, and isolation from others, is regarded) the degree to which task interdependencies are based on social relationships required to complete the task instead of social relationships that develop for other reasons, such as friendship; and how personal work goals and task interdependencies are either inadequately addressed or threatened by organizational directives and whether the design of the job is overspecified (the worker has little room for making autonomous decisions) or underspecified (the worker does not understand the parameters of the job).

Finally, Pasmore (1988) argued that since social systems are extremely complex, adaptable, and are constantly transforming and developing, social systems are the most complicated of all the organizational systems. Further, Pasmore claimed that organizations exist to meet, and must be structured to reflect, the needs of an organization's human resources. Organizations are developed and limited by the social system and dependent on the social system for adaptation and survival--only social
systems can change how an organization functions. This suggests that an instrument designed to assess the nature of organizational support systems for teams should emphasize the needs of its human resources.

**Technical Systems**

In addition to the environment and the social system, the last major component of sociotechnical systems theory is the technological system (Trist, 1959). Further, what some authors consider to be elements of the technological system appear to have become more abstract over time. For example, Cummings and Srivastva (1977) defined the technological system as the tools, techniques, and methods employed for task performance. Pava (1983) defined the technological system as the tools and techniques used to convert input into desired output. In the broadest definition, Pasmore (1988) argued that the technical system is comprised of tools, devices, techniques, configurations, artifacts, procedures, and knowledge utilized by employees to acquire inputs, transform inputs into outputs, and provide these outputs or services to customers.

By defining knowledge as technology, Pasmore, at least in part, has merged components of the sociotechnical system. Pasmore argued that a broad definition of technology is desirable, because it allows performance of tasks and the sociotechnical arrangements to be examined. The methods by which technology is arranged are critical in the sociotechnical systems theory perspective, because arrangement affects how the social component views and accomplishes its work.

*Technology and its effect upon organizations.* Pasmore et al. (1982) argued that technology has a series of effects on the behavior of an organization and its employees.
These effects can be characterized as first-, second-, third- and fourth-order effects.

First-order effects include the impact of technology upon organizational productivity. How technology is acquired to transform inputs into outputs directly affects how employees are physically located, the physical motions required to operate the technology, and the physical behaviors required to maintain a smooth operation of the system. Second-order effects result from the coordination needs of the individuals who operate the technology. For instance, some workers are assigned to operate the technology and others are assigned to manage the workers. Thus, roles and relationships, attitudes towards the organization, and the extent to which individuals relinquish freedom and autonomy for rewards, are established. Third-order effects are related to the skill level required to operate technology and the self-concepts which develop as the organization interacts with individuals who possess different skills. For example, the choice of technology affects who the organization hires, since individuals must be found with skills commensurate to technological needs. Then, as work roles become associated with different skills, individuals develop self-concepts in accordance with how they are treated by the organization. Organizations may treat individuals differently because of their different skills. Further, if the organization values individuals and allows for growth opportunities, the organization will tend to remain adaptable to the environment over time. The organization will become less adaptable, however, if employees are not valued and growth opportunities are restricted. Finally, fourth-order effects occur in society and in an organization's relationship with other organizations, because technology influences
the manner in which organizations are managed and their ability to compete with one another.

A potential criticism of Pasmore et al. (1982) is that the distinction between second- and third-order effects is unclear. For example, work roles (second-order effect) may be determined by skill (third-order effect), and the attitudes of individuals toward an organization (second-order effect) may be related to the individuals self-concepts (third-order effect). One explanation for the distinction between second- and third-order effects is that Pasmore, et al.'s description of technology is based on the establishment of work roles over time. Whereas Pasmore et al.'s description may be more applicable to an organization that is just beginning to develop its work roles, a more mature organization may have indistinguishable second- and third-order effects.

Joint Optimization

Another important feature of sociotechnical systems is joint optimization, and refers to the relationship between the social and the technical system (Fox, 1995). Trist (1981) argued that the technical and social systems are considered to be separate from each other in that the technical system follows the laws of natural sciences and the social system follows the laws of human sciences. However, they are highly related and interdependent in that the tasks of the production system requires social and technological systems for the transformation of inputs into outputs. An attempt to optimize either system results in the suboptimization of the sociotechnical whole. Both social and technological systems must function optimally if the whole system is to operate effectively (Cummings & Srivastva, 1977).
Levels of joint optimization. Further, Emery (1963; in Cummings & Srivastva, 1977) argued that the process of jointly optimizing the social and technical system can be viewed at different levels. At the individual level, joint optimization may include: (1) a variety of job tasks; (2) a meaningful pattern of tasks which give a semblance of a single overall task; (3) an optimum work cycle length; (4) suitable feedback and some scope in setting quantity and quality of production; (5) the ability to perform some auxiliary and preparatory tasks in the job; and (6) a job that is viewed with respect in the community. At the group level, joint optimization includes the development of interlocking tasks, job rotation, or the physical proximity of jobs. These factors: (1) create interdependence between jobs; (2) increase communication and standards of cooperation; and (3) are particularly important when jobs are highly stressful and when jobs make no obvious contribution to an end product. Further, groups: (1) should have an overall task which makes a contribution to the usefulness of the product; (2) should be able to set standards and receive feedback; and (3) should have some control over boundary tasks.

Joint optimization and change. Cummings and Srivastva (1977) claimed that joint optimization is a process that changes over time for three reasons: (1) the social and technological systems have different dynamics; (2) the social and technical systems change at different rates; and (3) the knowledge comes from more developed working conditions. For instance, dynamics of the social systems appreciate over time by growing to meet and adjust to environmental forces. The social system can continually learn and adjust, and is capable of self-generation to complex states in response to external conditions. In contrast, the dynamics of the technological system depreciate, because
they proceed in one stage from design to structural implementation, and because the technological system cannot elaborate themselves in response to external forces. Individuals, however, appreciate in their abilities and eventually outgrow existing technologies.

According to Cummings and Srivastva (1977) another complicating feature of joint optimization is that the social system changes at a slower rate than the technological system. As an organic system, individuals must proceed in growth stages, each stage involving reorientation, the perception of new conditions, and the learning, the unlearning, and the relearning of events. The mechanical nature of technological systems, however, allows growth to occur proceed immediately (e.g., construction to implementation occurs in one step). In structuring work relationships, it is easy to forget that these systems change at different rates, which can lead to a work structure that is focused on the faster-paced technological component.

Lastly, Cummings and Srivastva (1977) suggested that another complicating factor in joint optimization is differential knowledge of the social and technological systems. For technical systems, the laws that govern their dynamics and functioning is relatively well known making it easier to predict how technological systems should function in a variety of conditions. With social systems, however, the knowledge of dynamics and the understanding of optimal conditions for supporting creativity, problem-solving, and motivation are not well known. Similar to the rates of change, the difference in knowledge of the dynamics of the systems can result in a work system that
is geared toward the known dynamics of a technological system. Criticisms of the joint
optimization concept is offered below.

Sociotechnical Propositions

Pasmore and Sherwood (1978) argued that sociotechnical system has a set of
fairly stable propositions: (1) the organization must be designed to fit its goals; (2) the
organization must actively involve its employees in designing organizational structures;
(3) variances should be controlled, as much as possible, at their source; (4) systems
should be designed around whole pieces of recognizable tasks; (5) organizational support
systems should be congruent with organizational design; (6) the organization should
provide a high quality of life for workers; and (7) changes in the organization should be
continually made to meet environmental demands. Note, in addition to serving as
propositions for sociotechnically designed systems, these propositions might serve as
useful criteria for evaluating organizational systems that support employee collaboration.

Sociotechnical Principles

Similar to the propositions offered by Pasmore and Sherwood (1977), and the last
feature of sociotechnical systems theory discussed in this paper, are the principles of
sociotechnical systems design proposed by Cherns (1976, 1987). Cherns offers ten
principles of sociotechnical systems design, including: (1) compatibility; (2) minimal
critical specification; (3) variance control; (4) boundary location; (5) information flow;
(6) power and authority; (7) multi-functionality; (8) support congruence; (9) transitional
organization; and (10) incompletion or the Fourth Bridge principle. These principles
might also serve as useful criteria in assessing organizational systems for work teams and employee collaboration.

Compatibility. Cherns (1976; 1987) argued that the principle of compatibility refers to the understanding that the process of design must be compatible with the design's objectives. In practice, this means that the design team (a team of individuals tasked with designing or redesigning work processes) must tailor its own process and principles of operation to meet the principles that guide the design. Further, design team members must reach decisions by consensus and reveal their assumptions for examination by other group members. Experts should be included when needed, but must reveal their assumptions and truly represent individuals from their functions.

Minimal critical specification. Cherns (1976; 1987) indicated that the principle of minimal critical specification has a negative and a positive aspect. The negative aspect of this principle states that no more should be specified in a job design than is absolutely necessary. The positive aspect of the principle states that it is important to specify in a job design only that which is essential to performing the job. This principle does not propose that organizations should leave organizational needs unspecified (e.g., goals and objectives). However, organizations should be selective in determining how the work is done, less the organization close options prematurely. This principle is important to the continuing development of the social system, because the individuals develop at a slower rates (see the discussion of joint optimization above for more information on the growth rates of social systems) than technology (Cummings &
Srivastva, 1977). Thus, the social system may need freedom in determining work functions in order to meet growth needs.

**Variance control.** Cherns (1976; 1987) argued that variance control refers to variances that should be addressed as near as possible to the point of origin. Thus, variances should not be transported across units, departments, or other organizational boundaries (vertically or horizontally). For example, in an automobile assembly line, a variance might be transferred horizontally if an improperly assembled engine is installed in an automobile. In knowledge work, a horizontal variance could occur if a poorly designed product, which does not fit with other components, is given to manufacturing to produce and assemble. An example of a knowledge work variance transferred vertically is when a report based on inaccurate data is given to upper level management. By controlling variances at their source, fewer levels of supervision and control are needed, and it is possible to allow individuals more complete jobs, since they need the resources necessary to reduce variances. Methods for identifying variances include variance control tables.

**Boundary location.** Miller (1959) argued that simple systems are differentiated into complex systems by setting boundaries on one of three criteria: technology, territory, and time. An example of grouping by time is to develop work shifts; an example of grouping by technology would be to separate jobs by their functions, such as grouping welders separately from painters; and an example of grouping by territory would be to establish different manufacturing facilities in different geographical locations.
However, Cherns (1976; 1987) argued that boundaries should not be established in ways that impede the ability of organizational members to share information, knowledge, and learning. A corollary of this principle is that as control of activities become the responsibility of members within the boundary of the team, the more the role of the team's manager becomes one of handling boundary activities (e.g., ensuring adequate resources, coordinating with other departments, or scanning the external environment for changes that may affect internal boundaries). Further, members within the boundary may learn to handle increasing levels of autonomy and manage their own boundaries under favorable circumstances.

Information flow. According to Cherns (1976; 1987), this principle states that the information system should be developed so that information is available to those that need it. Stated another way, boundaries should not be inserted that interrupt or "loop" information and produce obstacles. Further, information has three uses to organizations: control, recording, and action. Information loops that act as control by top management often result in intervention by managers. Ironically, intervention by managers is often the first time subordinates learn of negative information. Information for recording is essential but also has the potential of being abused and should only be used when needed. Information for action should be available first to those who are required to act.

Power and authority. Cherns (1976; 1987) argued that individuals with responsibilities need the materials and resources to carry out their work and should have the responsibility for the economical use of these resources. Power and authority can also be gathered by virtue of knowledge and experience and needs to be appropriately
managed. For instance, individuals with knowledge and skills necessary for task completion should be included on a team, or, individuals with power over areas or in certain areas might be included on a team to ensure that their "buy-in" is obtained. Further, Cherns states that the principle of power and authority is closely associated with the principle of information flow, since information diverted to top management can seduce managers into intervening in the work of those they manage.

The multi-functional principle. In this principle, Cherns (1987) argued that organizations must adapt to their environments and that organizational elements must adapt to their environments and other organizational elements. Further, organizations can adapt by adding new roles or modifying former roles. However, adding experts can increase the difficulties associated with organization integration by confusing lines of authority, increasing the need for regulation, and establishing standards. For example, standards, regulation, and confused lines of authority might develop if a functional expert is included in a department, and individuals are required to report to this individual when functional problems occur. Regulations might be written and standards developed to separate the lines of authority between the functional expert and the manager of the department (see the discussion of the classical management principle line-staff organization in the first part of this paper). Adding an expert as trainer may be more productive in the long run as individuals and teams learn new skills without developing new lines of authority or the problems associated with changing responsibilities.

In addition, Cherns (1976) contended that traditional forms of organizations often rely on redundancy of parts. Redundancy of parts refers to the specialization and
reduction of jobs into easily manageable parts (see the classical management principle
division of labor above) and often results in rapid turnover, since individuals are easily
replaced (Cherns, 1976). However, sociotechnical systems theory is based on the
redundancy of functions in that individuals and groups of individuals possess a wide
repertoire of skills that increase the ability of the organization to remain flexible. Note,
this is not always possible for knowledge workers (see the Multi-Skilling in Production-
and Knowledge-Based Work Teams section in this paper). Through use of redundant
skills, organizations have greater potential for meeting the adaptation needs created by
complex and uncertain environments (Trist, 1981). This is also related to the systems
principle of equifinality, a principle that may only be available if the job design is based
upon the principle of minimal critical specification or the redundancy of functions
(Cherns, 1976).

Note, Cherns (1976; 1987) multi-functional principle clarifies the open systems
concept in terms of what is considered a sociotechnical system's environment. In addition
to an external environment outside the boundaries of an organization, sociotechnical
systems must adapt to other environments within the organization as well. As will be
seen, for knowledge work, internal organizational environments may just as important as
external organizational environments. This is discussed in more detail below.

Support congruence. According to Cherns (1976; 1987), the principle of
support congruence refers to the design of organizational support systems congruent with
behaviors they are designed to elicit. For example, in a organizational system designed to
elicit group behaviors, the rewards system should also be designed to elicit group
behaviors. Other important organizational support systems include selection systems, training systems, conflict resolution systems, work measurement systems, performance assessment systems, leave allocation systems, promotion and separation systems, and actions by management (support systems are summarized before the methods section below). Further, this congruence should be extended to information systems, financial controls, and in sales, purchasing, planning, and marketing.

Transitional Organization. Cherns (1987) indicated that transition is experienced if the site is either a "green field" (new) site or an existing site. For the former, the process of managing the startup must be determined. In the latter, the problem of maintaining production or service levels while training or redesigning the work processes must be determined. In either case, the redesign process should be seen as a vehicle of transition and accompanied by new values and new methods of leadership. The principle of compatibility is particularly evident when individuals are selected for redesign, for training, and for termination.

Incompletion or the fourth bridge principle. The last principle Cherns (1976; 1987) discussed is based on the Fourth Bridge example, a bridge that needs painting to retard rust. Upon completing the painting of the bridge from end to end, the first end of the bridge needs painting again. Thus, this principle states that as soon as redesign is completed and implemented, the consequences of the redesign will indicate the need for redesign. Implicitly stated in this principle is the understanding that there is no real period of transition, but only one period of transition to another. Continuous redesign supports the idea that teams are never fully developed, but instead, transition from one
steady state to another (see the concept of equifinality discussed in the open systems section above).

Criticisms of the Sociotechnical Perspective

Several authors are critical of sociotechnical systems theory. Criticism appears to focus on the theory itself, difficulty implementing the theory in work settings, joint optimization, and problems applying the theory to knowledge-based settings. The following discusses critiques of sociotechnical systems theory by Kelly (1978), Cummings (1981), Hackman (1981), and Emery (1995). Difficulty applying sociotechnical systems theory to knowledge-based settings is discussed in the next section of this paper.

General Criticisms of Sociotechnical Theory

Cummings (1981), argued that many sociotechnical systems theories are "frustratingly nonspecific" (p. 80); that few systematic and empirical assessments exist for evaluation and examination of sociotechnical systems theory; and that work teams are too often chosen as the "cure all" solution in redesign. Hackman (1981) argued that sociotechnical systems theory offers few specific propositions which can be empirically disconfirmed (assuming this is important); that few empirical assessments exist for work systems redesigned with sociotechnical principles, and those that do exist fail to examine the interplay between different levels (e.g., individual, group, and organizational levels) of the design; that individuals may be "lost" or exploited in an attempt to realize gains for the group; and that work environments that support successful sociotechnical systems need to be articulated. The issues identified by Cummings and Hackman reflect the
importance of having specific hypotheses and propositions in a theory of knowledge-based work teams.

**Criticisms Implementing Sociotechnical Systems Theory**

Kelly (1978), in a review of the case studies from which sociotechnical systems theory was derived, argued that: (1) joint optimization can be reinterpreted as a method of intensifying labor, because group responsibility is averaged across individuals and then workloads are increased; (2) the social system appears to adapt to technological change, which can decrease the autonomy of workers in performing tasks; (3) changes in output and product quality are more easily accounted for by changes in pay incentives; and (4) the "one best way" of Taylorism has been replaced with the "one best way" of sociotechnical systems theory--work teams. Pasmore et al., (1982) also found evidence to suggest that few technological changes are made in redesign efforts.

Further, a damaging blow was struck to sociotechnical systems theory by one of its "founders". Emery (1995) argued that: (1) sociotechnical systems theory has been conceptually complicated to the point where only experts, consultants, and academics can understand it; (2) job reengineering is a "last ditch effort to preserve bureaucratically designed organizations" (p. 6), a problem that may result from the expert driven design of sociotechnical systems; and (3) consultants utilize sociotechnical systems theory to delay the organizational change process and develop dependencies so that fees are maintained. Emery's criticism of sociotechnical systems theory highlights the importance of conceptually "simple" organizational redesign theories and processes. For instance, Emery advocates a redesign process called "Participative Redesign". For the purposes of
this paper, Emery's criticism of sociotechnical systems theory as conceptually complicated is used to identify theoretical structures of knowledge-based settings that are easy to understand.

Criticism of Joint Optimization

Hackman (1981) and Cumming's (1981) criticism that sociotechnical systems theory is not specific and difficult to empirically evaluate, seems particularly relevant to joint optimization. Joint optimization refers to the development of a balance between the social and technological systems. Through joint optimization, the social and technical systems are frozen into a "best fit" that meets the needs of the organization at that point in time (Purser & Pasmore, 1992). However, sociotechnical systems theory weakly defines how the balance between the social and technological systems is to occur and when the balance is achieved; sociotechnical systems theory offers little information for determining when a sociotechnically designed system should be "refrozen" seem scarce; and freezing the social and technical systems into a unchanging form seems contrary to Chern's (1987) Fourth Bridge Principal, that redesign is continuous and ongoing. It can be argued that specification of the balance is impossible since every sociotechnically designed organization is unique (Pasmore & Sherwood, 1978). However, the difficulty identifying specific characteristics of joint optimization suggests the importance of having disconfirmable propositions in a theory of knowledge-based work teams.
Modification of Sociotechnical Systems Theory for Knowledge Work

Another criticism of sociotechnical systems theory is difficulty applying the theory to nonroutine settings (Cummings, 1986; Pava, 1986; Purser & Pasmore, 1992), since sociotechnical systems theory was developed for routine, linear work systems (Cummings, 1986; Fox, 1995). In the following section, the theoretical foundation of sociotechnical systems theory presented above is discussed in terms of its applicability to knowledge-based work settings. To highlight problems for sociotechnical systems theory and knowledge work, a "pure" knowledge work team is used as an example. For the example, consider a four member, temporary, multi-functional team tasked to design a computer modem (a computer device which sends and receives information across phone lines). The team is composed of an engineer who is to design the "hardware"; a computer designer who is to design the "software"; a manufacturing supervisor who is to produce the modem; and a representative from marketing. This example is compared to the open systems perspective, the five properties (import-conversion-export cycle, boundaries, steady state, regulation and control, and equifinality) that explain how organizations interact with their environments (Cummings & Srivastva, 1977), the technical and social systems, and the propositions (Pasmore & Sherwood, 1977) and principles (Cherns, 1976; 1987) of sociotechnical systems theory design. The following discussion is used as a basis to identify systems that support team-based organizations.
The primary problem in applying the open systems concept to knowledge work appears to be in understanding the role of internal turbulence to the internal environments of a system. Linearly based manufacturing systems appear to be based on stable internal environments (well-established import-conversion-export cycles, stable boundaries, and stable regulation and control systems) and turbulent external environments (i.e., systems theory proposes that systems maintain steady states by adjustment processes which counter environmental disruptions; Cummings & Srivastva, 1977). For example, a production-system can adapt to changing demand for products by altering production rates. In knowledge-based settings, however, external and internal environments are both turbulent. For instance, in the example of the modem team, the programmer may be unable to begin software development until certain parameters of the hardware are determined. However, hardware design may not begin until the engineer receives input from manufacturing and marketing. Marketing may not be certain of what external customers need, because two new software language protocols are competing for dominance in the marketplace. Thus, uncertainty and interdependence (see the characteristics of knowledge work above) (Pava, 1986) appear to create internally turbulent environments that affect the performance of knowledge work. Organizational systems which may reduce internal turbulence (McDermott, 1995) are discussed later in this paper.
The Import-Conversion-Export Cycle for Knowledge Work

The import-conversion-export cycle retains its conceptual value for knowledge-based work teams if the inputs and outputs into the system are considered knowledge (e.g. Purser & Pasmore, 1992). For instance, the import-conversion-export cycle for knowledge production can be divided into three stages—discovery (determination of knowledge work inputs into the production process), exploration (the process of analyzing and exploring solutions), and implementation (production or implementation, of the solution) (Purser & Pasmore, 1992). However, what is implied in Purser and Pasmore’s import-conversion-export cycle for knowledge work is the importance of organizational systems which facilitate the import-conversion-export cycle. The following uses the discovery, exploration, and implementation stages to highlight important organizational systems that may increase the effectiveness of the knowledge-based import-conversion-export cycle.

Discovery phase. Purser and Pasmore (1992) argued that in the discovery phase of the input-conversion-output process, inputs to the knowledge production process are determined. However, the manner in which organizations view their environments may affect data collection methods. For example, organizations can be distinguished according to their beliefs about the environment (e.g., whether the environment is analyzable or unanalyzable) and the degree to which organizations "intrude" upon their environments (e.g., whether the organization seeks information from the environment or passively accepts environmental information) (Daft & Weick, 1984). Smircich and Stubbart (1985) contended that organizations can view their environments as objective,
perceived, and enacted. Objective environments are viewed as real and separate from the organization. Data collection methods focus on recognition of what already exits in the environment through discovery methods. Perceived environments are real and separate from the organization, but information is more difficult to collect due to "incomplete and imperfect perceptions of the 'environment'" (p. 726). Finally, in enacting environmental modes, organizations construct their environments (Daft & Weick, 1984), since enacted environments view the "world [as] essentially an ambiguous field of experience" (Smirchich & Stubbart, 1985; p. 726). The extent to which environments are considered analyzable affects organizational information gathering techniques and interpretation processes used to develop strategies and make decisions (Daft & Weick, 1984).

For example, Purser and Pasmore (1992) claimed that organizations use different data collection mechanisms depending on how organizations view their environments. Analyzable environments (i.e., objective environments) can be evaluated by external data search mechanisms, such as market and feasibility studies. Discoverable environments (i.e., perceived environments) can use less systematic and informal methods of data gathering, such as contacts with customers or data collection through the use of internal experts. For unanalyzable environments (i.e., enacted environments) inventive selection mechanisms are useful. Inventive selection refers to the collection of data entirely within the organization and to the development of radical innovations and technical breakthroughs. Uncertain environments can influence organizations to construct their own environments (Daft & Weick, 1984). For example, the Apple Macintosh Computer was developed using inventive selection mechanisms (Purser & Pasmore, 1992).
The objective, perceived, and enacted modes can also affect the organization in other ways, since managers may interpret information from the environment without thinking how their role defines the environment for other organizational constituents (Daft & Weick, 1984). Further, managers may want to consider new interpretation modes (objective, perceived, or enacted) to obtain new and valuable information from their environments (Daft & Weick, 1984).

**Exploration phase.** The exploration stage signals a shift to analyzing and exploring solutions and to clarifying the original problem. Clarifying the problem can return the group back into the discovery phase (Purser & Pasmore, 1992). A key component in the exploration phase is the use of deliberations (Pava, 1986). Deliberations refer to the exchange and communication of topics in forums that help reduce uncertainty. Deliberations should not be confused with decisions or meetings. Instead, deliberations are ongoing encounters, exchanges, or reflections that help reduce uncertainty and can occur in a meeting or can result in a decision (Pava, 1986). Deliberations can be considered ongoing discussions with a purpose, including the exchange of information and creation of knowledge through conversations.

Purser and Pasmore (1992) claimed that deliberations constitute the core of the conversion system from knowledge into decisions through the "exchange, synthesis, and interpretation of knowledge" (p. 76). Information systems can facilitate deliberations given that they support and augment the ability of organizational constituents to think. Further, the social and technical systems are increasingly difficult to differentiate during
the exploration stage, since the social component of the knowledge-based system must translate the information into knowledge and make decisions.

**Implementation phase.** During the implementation phase, Purser and Pasmore (1992) proposed that knowledge and learning must be transferred or acquired by the individuals responsible for implementation (i.e., production) of the knowledge. For example, the modem team might transfer modem designs and plans to a production department. Results from transferring knowledge to implementation systems can result in recycling to previous stages. In addition, problems or insights during the implementation stage, the outcomes from deliberations, and the learnings from previous stages, should be captured by learning and storage mechanisms.

**Knowledge Work and the Primary Task**

The benefits from identifying the primary task of an import-conversion-export cycle have been discussed above (see the Systems and the Import-Conversion-Export Cycle section in this paper). However, in knowledge-based work settings the primary task may be difficulty to identify (Purser & Pasmore, 1992). In the modem team example, the primary tasks (identify and meet internal and external customer needs, develop hardware, software, and a manufacturing process) all appear to be dominant (and interdependent) processes. If the primary task, however, is identified as developing the least expensive modem on the market, then the organization provides direction for the group by giving information that may determine priorities and trade-offs. Thus, boundary management issues may be critical to knowledge workers in determining the primary task of knowledge-based teams. For instance, managers should provide information that keeps
team abreast of organizational goals (Fisher, 1993) and if organizational goals change (Mohrman et al., 1995).

**Knowledge Work and Internal Constraints**

Internal constraints refer to primary task demands that rely on a particular component of a system. For knowledge-based work settings, internal constraints might be identified by organizational structures that provide information sharing, avenues for making trade-offs, and direction-setting mechanisms (e.g., Mohrman et al., 1995). For example, if the primary task of the modern team is to meet customer needs, the marketing component of the team is identified as the internal constraint. Direction is provided to the team, since other team systems know that the goal is to optimize the product to meet customer needs. If the primary task of the team is identified as developing the best customer interface in the market (e.g., powerful, yet simple, software) then the software development system is identified as the team's internal constraint. Direction is provided to the team, since other team systems know that the goal is to optimize to fit of their contributions to the software package.

**Knowledge Work and Boundaries**

Knowledge-based work system's external and internal boundaries may be affected by high levels of internal and external turbulence. Internal and external conceptual boundaries for the team may change, since the primary task of a knowledge-based group may depend on internal or external organizational turbulence. Turbulence may affect organizational goals and priorities and the tasks that need completion to meet organizational needs. For instance, internal turbulence in the modern team may change
the primary task if a software engineer determines that a different software "language" should be used to develop software code. Other group members, then, work on other projects until the software engineer is familiar with the new software language. External turbulence may affect the team if the economic market suggests that the company will not be competitive in the market. The company may decide to terminate research on the project and disband the group.

**Knowledge Work and Steady States**

Turbulent internal environments appear to affect the ability of a knowledge-based system to maintain a steady state. In fact, steady states for knowledge-based work systems may not exist (Purser & Pasmore, 1992). Instead, knowledge-based work systems may be characterized by constant adaptation and growth into increasingly complicated states. Disruptions, conflict, and variances may be the norm. Knowledge-based work systems that exhibit "steady states" may be mislabeled, or near the end of their productive life-span.

Further, whereas import and export variables for production-based teams may usually be physical in form, import and export variables for knowledge-based systems may always be knowledge (see the Import-Conversion-Export Cycle for Knowledge Work section). Conversion variables in knowledge-based work systems may refer to the social components of the system and the organizational systems that support the social system. For example, support systems that reduce the internal turbulence in a knowledge-based work system might include mechanisms that help prioritize and share key information, and mechanisms that share learning between team members and other
teams. Further, similar to production-based settings where the social and technological systems must maintain steady states in order for the whole system to maintain equilibrium, social and organizational support systems in knowledge-based settings must maintain steady states to minimize the turbulence experienced by the larger system. For instance, if goal setting and information systems are functioning inadequately, or if individuals will not participate in sharing knowledge, the whole system suffers.

The Regulation and Control of Knowledge Work

Regulation and control mechanisms may take on a different meaning in knowledge-based work systems. Whereas negative feedback may be useful for systems utilizing stable processes, knowledge-based systems may only benefit from positive feedback. In this case, positive feedback continually moves the system (the team) to higher-level conditions and new levels of growth. Effective knowledge-based work systems, then, may be characterized by constant growth and adaptation.

Knowledge-based work settings that experience negative feedback and attempt to maintain steady states may be nearing the end of its usefulness to the organization. Further, the criteria given by Cummings and Srivastva (1977) necessary for successful regulation of a system, are even more critical in knowledge-based work settings. In fact, these criteria should be considered organizational support systems. Identification of key information, shared learnings, direction setting and tradeoff making mechanisms provide the positive feedback needed by knowledge-based work systems to maintain constant adaptation and growth to more complex forms.
Knowledge Work and Equifinality

Whereas linear systems can function very well with stable and inflexible processes, for knowledge work, the systems principle of equifinality appears to be a necessity when producing outputs. The complex and dynamic nature of task performance may require a great deal of flexibility in determining the processes which produce the final product (knowledge). Thus, knowledge-based work teams may require a multitude of paths in order to survive and meet external and internal environmental demands. This suggests that knowledge-based systems need management systems that understand the need for flexibility in knowledge-based teams, that provide the time and resources needed for exploring multiple solutions, and that provide information (priorities and goals) concerning how a possible solution might be evaluated.

The Technological System in Knowledge Work

Purser and Pasmore (1992) argued that technical systems in knowledge work are characterized by the nonroutine nature of the work, task interdependence, and control. Nonroutine refers to the highly uncertain, unique, and nonrepetitive aspect of conceptual work; task interdependence refers to the assessment that nonroutine work is rarely dependent on one individual; and mode of control reflects the "nonmeasurable, highly discretionary nature of the tasks performed" (p. 44).

Nonroutine. For example, Pasmore and Gurley (1991) argued that nonroutine work is undefined at commencement—the nature of the work is uncertain, and how and who will perform the work is often determined as the task is carried out. Decisions are often made by intuition, since little information exists, which makes time parameters for
project completion impossible to predict. The goals of knowledge workers (McDermott, 1995) and the many alternatives available for project completion, produce conflict (Pasmore & Gurley, 1991). Evaluating the performance of knowledge workers is not always possible (Shapero, 1985), and variances of knowledge workers are often hidden (Pasmore, 1988).

**Task interdependence.** When tasks are highly interdependent, organizations must create mechanisms that integrate behavior across interdependent groups (Galbraith, 1977). For instance, organizations that manage rapid technological and innovative change may benefit from formal structures and quasi-formal structures (Schoonhoven & Jelinek, 1990). Formal structures refer to formal reporting relationships often illustrated on organizational charts. Informal structures can refer to committees, task forces, teams, and other "dotted-line" relationships that are sanctioned by the organization as legitimate. Informal structures work in conjunction with formal relationships to meet organizational needs by addressing the multiple interdependencies and uncertainty that characterize nonroutine work (Schoonhoven & Jelinick, 1990).

Furthermore, task interdependence might refer to other mechanisms that facilitate learning and social support among team members. Task interdependence might include group meetings where groups of experts share learnings on functional expertise (Mohrman et al., 1995) or develop task performance strategies (Hackman, 1987). Task interdependence can also refer to mechanisms that increase the ability of team members to work together, such as training on interpersonal skills or decision-making skills (Harrington-Mackin, 1994).
Mode of control. Control mechanisms and knowledge-based systems have been discussed (see the Knowledge Work and Control section). For example, performance evaluation is often difficult with knowledge workers, since the problems and the manner in which knowledge-workers address problems may not be comparable (Shapero, 1985). Performance in knowledge-based work settings is often measured by project reports, comparison of budgets with other companies, the number of individuals working on a project, and the number of high-caliber individuals in an organization (Pasmore & Gurley, 1990). Decision-making is often difficult, since individuals with important knowledge may be difficult to identify (Pasmore & Gurley, 1990). Time may be difficult to control, since knowledge-based work systems often measure time in years (Pasmore & Gurley, 1990). Finally, knowledge workers can choose to make their knowledge available to companies, or they can choose not to (Pasmore, 1988).

Social System Characteristics of Knowledge Workers

Purser and Pasmore (1992) argued that knowledge workers are considerably different than workers in production-based settings in that knowledge workers tend to be more autonomous, more specialized, and operate under longer "time horizons". In their review of the literature, Purser and Pasmore identified three dimensions for social systems and knowledge workers: characteristics of the knowledge worker, role specialization, and temporal aspects of task assignments.

Characteristics of knowledge workers. Knowledge workers tend to be highly educated (Mohrman et al., 1995), often demand special treatment (Badawy, 1978), demand autonomy (Von Glinow, 1988), and are less committed to the organization than
to their work or other professionals (Von Glinow, 1988). Knowledge workers often have needs in conflict with the needs of customers, often have difficulty communicating with other professionals because of their specialized training, want control over which projects they work on, resist outside intervention, and often resist having their work evaluated by anyone other than similarly skilled professionals (Resnick-West & Von Glinow, 1990). These characteristics suggest that management must pay special attention to the needs of knowledge workers, and must use interpersonal skills when evaluating and aligning the work of knowledge workers with organizational needs and priorities.

**Role knowledge.** Knowledge workers have a great deal of specialized training in an area of expertise (Resnick-West & Von Glinow, 1990) which can increase the difficulty of operating in multi-functional teams, since knowledge workers have difficulty understanding the terminology used by other professionals (Mohrman et al., 1995). Further, the expertise of knowledge workers may become too abstract and overly specialized (Von Glinow, 1988) which may make it difficult to communicate with others outside their specialty or which may make it necessary to consult with others outside the organization to gain important knowledge (Resnick-West & Von Glinow, 1990). Thus, management must develop support systems which help knowledge workers communicate with one another and which help knowledge workers seek assistance from other qualified professionals.

**Temporal aspects.** Zand (1981) argued that knowledge work is characterized by the rapid formation and the abrupt termination of work teams, which can increase stress among workers. For example, knowledge workers can experience stress, such as mental
and emotional fatigue when assigned to a variety of tasks, when required to develop
constantly changing relationships, and when knowledge work demands ongoing alertness
and concentration. Managers can help by: (1) ensuring that goals are appropriately
defined and selected; (2) reducing the extent to which actions are affected by individuals
with different goals; (3) identifying other influential individuals who have important
knowledge and can influence knowledge work projects; and (4) by separating the idea
from the person when evaluating proposals.

Zand (1981) also argued that managers should be alert to the results of job
longevity. For instance, Katz (1978) found evidence to suggest that individuals who had
been in jobs for 10 years or more entered an "unresponsive" stage, where employees may
adapt to job longevity and stability by becoming less excited or concerned about the
meaningfulness of their jobs. However, exceptions to the unresponsive stage may occur
if employees are rotated between jobs. Different policies and managerial activities, then,
might be more relevant to employees at different stages of their careers.

Purser and Pasmore (1992) argued that these factors emphasize the importance for
developing dynamic organization structures that are supportive of individual's thinking
processes. For example, Purser and Pasmore argued that management behaviors must
change during the different phases of knowledge development. During the discover and
exploration phases, managers must use their intuitive sense in knowing when to
intervene, when to apply pressure, when to give direction, or when to leave the team
alone. This is important, since it is difficult to force individuals to be creativity (Amabile,
1990). Management behaviors might be different in the implementation stage, however,
when deadlines, timing, coordination issues, and execution issues are critical to implementation activities. Thus, managers must be sensitive to the rhythms and phases of knowledge workers and adjust management behaviors to meet the rhythmic needs of a group.

**Criticism of Knowledge-Based Technological Systems**

A potential criticism of Purser and Pasmore (1992) is their insistence that knowledge creation is a social and a technological process. For instance, "we conceive the core of knowledge technology to be essentially a cognitive activity, involving the transformation of equivocal and chaotic information inputs (e.g., request for new products, market need data, technical ideas) into a codified and valued set of concrete outputs (e.g., product designs, prototypes, or strategic decisions)." (p. 44). Purser and Pasmore refer to the technological component of a knowledge-based system as "conceptual technology" characterized along three dimensions—nonroutiness, interdependence, and mode of control (see the Technological System in Knowledge Work for an explanation of these dimensions).

The technological system of knowledge work as social processes. However, the rationale for dividing knowledge-based work systems into technical and social components is unclear. For example, how is interdependence in knowledge-based work settings (Purser & Pasmore, 1992) a "technical" and not a "social" process? That is, interdependencies among team members developing or creating knowledge seems to load more on the social abilities of the teams members to share knowledge and develop solutions to problems. Team members with the social skills to listen, understand other
perspectives, constructively solve conflict, and make good decisions would seem more likely to effectively transform informational inputs into useful knowledge. Thus, interdependencies might be better classified as a social aspect of knowledge work rather than a technical one.

The technological system of knowledge work as descriptive labels. Further, other characteristics of knowledge work seem to be descriptive labels of knowledge work than technical characteristics. For instance, nonroutiness (Purser & Pasmore, 1992), in part, seems to represent descriptive characteristics of knowledge work rather than a "technical" process of completing knowledge work. For instance, the influence of unexpected events upon the nonroutine nature of work processes (Pava, 1983), is listed as a technical system characteristic of knowledge work (Purser & Pasmore, 1992). However, is this under the control of the knowledge worker? If the core of knowledge technology is a cognitive activity (Purser & Pasmore, 1992), do knowledge workers use cognitive activities to control unexpected events that affect their work, or instead, do they react to the unexpected events? The latter seems more accurate. If knowledge workers react to nonroutine and unexpected events, perhaps nonroutine and unexpected events are more accurately characterized as a descriptive characteristic of knowledge work, rather than as a technology used to control production process (i.e., knowledge creation). For example, unexpectedly, when needed but unavailable information forces a knowledge worker to work on another project, what cognitive activity takes place? The knowledge worker may decide to take advantage of slack time to work on another project or to reprioritize his or her work schedule. The decision to work on another project is a
cognitive activity, but is it knowledge creation? This suggests that many of Purser and Pasmore's technological components of knowledge work are descriptive labels of knowledge work rather than technological (e.g., knowledge creation) components.

Further, difficulty measuring productivity (Pasmore & Gurley, 1992) is used by Purser and Pasmore (1992) as a technical characteristic in knowledge-based work systems. However, is this a descriptive characteristic of knowledge work or a conceptual tool used to create knowledge? Certainly, the creation of a system to measure knowledge work productivity would be a cognitive activity. Yet, the completed system may be more accurately identified as an organizational support system than a technical characteristic of knowledge work.

Knowledge work as one system. These examples illustrate a problem for applying a social and technical conceptualization to knowledge-based work settings—the classification of separate social and technical components may be more applicable to production-based systems, where individuals work with physical tools and processes. Further, in knowledge-based work systems, the social and technological systems might become the social system or the socio-cognitive system. The label socio-cognitive might reflect the role of knowledge creation to the social systems. Additionally, to increase the specificity of a theory for knowledge-based work system, the characteristics of a knowledge-based technological system offered by Purser and Pasmore (1992) (nonroutiness, interdependence, and mode of control) might be operationalized in terms of organizational support systems that link individuals, teams, and business-units (e.g.,
Galbraith, 1994) collaboratively. In the case of knowledge work, the systems would have to be specialized for developing, creating, storing, and accessing knowledge.

For instance, what organizational support systems facilitate interdependencies between members of a knowledge-based work team? Possible systems could include: (1) clear goals and priorities for the team; (2) clear goals and priorities for individuals; (3) decision-making mechanisms; (4) conflict resolution mechanisms; (5) mechanisms for involving needed individuals in key deliberations; (6) supportive management behaviors; and (7) rewards that encourage collaboration between team members, etc.

One objection to removing the technological component in knowledge work is how to classify computer technology, data management tools, standardized work processes, and coordination mechanisms. Knowledge workers benefit greatly from data management tools that identify stages and decisions involved in developing knowledge (McDermott, 1995); standardized work processes (e.g., a product development team works together over many cycles and develops a common language) facilitate development of knowledge (McDermott, 1995); and quasi-formal coordination mechanisms (Schoonhoven & Jelinek, 1990) are useful mechanisms for integrating the work of knowledge-based systems. It could be argued that these components reflect technological system components of knowledge work. However, these aspects might just as easily refer to organizational support systems (e.g., data management tools). Further, the example given by McDermott of standardized work processes seems heavily dependent on social processes, such as communication and interaction among knowledge workers. More advanced forms of quasi-formal, such as integrating roles, might also
depend heavily on the social abilities of individuals. Galbraith (1994) for instance, argued that integrators must rely heavily on social skill. Thus, computer technology, data management tools, etc., could easily be classified as organizational support systems.

Knowledge Work and Sociotechnical Propositions and Principles

Many of the propositions and principles of sociotechnical systems theory appear highly applicable to knowledge-based settings. In fact, the compatibility principle (organizational design must be compatible with its objectives) is the primary thesis of this paper. Several principles, however, may need modification for use with knowledge-based work teams. For instance, variance control in knowledge-based settings is problematic, since key variances in knowledge work often occur from the thinking processes of individuals (Pasmore, 1988). However, giving feedback to individualistic knowledge workers (Pava, 1986) may have to be done with special care at risk of alienating the individual. Finally, the multi-functional principle and the redundancy of functions may not be an option for many knowledge-based work teams. Knowledge work often requires deep skills in an area of expertise, and learning deep multiple skills may not be possible (Mohrman et al., 1995).

Criticisms of Redesigned Sociotechnical Systems Theory

A major argument in this paper is that the needs of employees in production-based settings is different from the needs of employees in knowledge-based settings. For example, Purser and Pasmore (1992) argued that knowledge workers are considerably different than workers in production-based settings in that knowledge workers tend to be more autonomous, more specialized, and operate under longer "time horizons".
Resnick-West and Von Glinow (1990) stated that professional workers are motivated differently, have different values, and have different work behaviors.

However, some authors suggest that knowledge workers, intent on protecting their status, create differences between themselves and other workers. For instance, Purser and Montuori (1995) warns (note: Purser is a major contributor in the modification of sociotechnical systems theory to knowledge-based settings!) us that:

Knowledge workers have a vested interest in maintaining their status...and so it appears that the [sociotechnical systems theory] contingent has been duped into believing that knowledge work is a mysterious enigmatic practice which requires a special theoretical and methodological treatment. ...Moreover, we argue that [sociotechnical systems theory] practitioners have unwittingly been co-opted into preserving the entrenched social interests of expertism by generating their own obfuscat ing methodologies which gives separatist treatment to knowledge workers (p. 132).

Purser and Montuori suggest that theoretical differences between work settings is due to the workers. However, explanation of differences in work needs is that task demands create these differences. This is discussed briefly in the next section of this paper.

Differences In Worker Needs Via Task Demands

For example, in production-based settings, the linear nature of the input-conversion-output processes may make work less ambiguous than work in nonlinear work settings. Production workers, then, may have less need for organizational
support systems that provide direction, manage conflicts of interest, etc., since the job is
designed to provide this support. Knowledge workers may have a greater need for
support systems, since their job roles are less certain, and their job performance depends
upon organizations providing timely information and direction. Thus, the uncertainty and
complexity of the input-conversion-output system (see the Multiple, Concurrent
Conversion Processes and Nonsequential Conversion Flows section in this paper) for
knowledge workers may create different needs compared to workers in production-based
settings.

Further, organizational needs for support systems in complex and uncertain work
settings may increase over time for most jobs. For instance, whereas service- and
knowledge-related jobs work accounted for 55 percent of U.S. private sector jobs in the
1970s, they accounted for 75 percent of jobs in the 1990s (McDermott, 1995).
Additionally, some authors argued that all workers should be viewed as knowledge
workers (Nolan & Croson, 1995). It could also be argued that organizational support
systems are beneficial to organizations regardless of worker's job functions or roles. For
example, even though there may be less need to reinforce collaborative behaviors among
production personnel, unless the costs of maintaining the systems are substantial, how can
organizations not benefit from increased collaboration? Thus, organizational support
systems may become a more important part of worker performance in the next century.

Section Summary

To summarize this section of this paper, work teams are fast becoming an
increasingly important component of work, since teams can meet worker's needs and
fulfill organizational goals (Harrington-Mackin, 1994; Maddux, 1986; Ray and Bronstein, 1995). Classical management principles were described (Galbraith, 1977), because they can act as barriers to employee participation (Lawler, 1992), and implementation of teams can challenge the effectiveness of classical management principles in organizing work (Purser & Pasmore, 1992). It was also argued that success in the current economic environment may require organizations to involve employees in their work (Lawler, 1992) by investing in their employees (Miles & Snow, 1994) and reinventing organization structures to support employee involvement, collaboration, and to meet organizational goals.

In addition, popular definitions of “teams” were provided and teams where described across several characteristics, including the difference between naturally occurring work groups and teams, empowerment, management roles and teams, team tasks, single-functional versus multi-functional teams, multi-skilling, and duration of teams. Then, characteristics of knowledge work and other types of work were presented and differences between production- and knowledge-based teams were given, including the relationship between organizations and knowledge workers, knowledge work and motivation, unobservable variances, knowledge worker’s roles in organizations, nonlinear work processes, knowledge work and control, multiple job functions, uncertainty, change, interdependence, individualistic professionalism, integration and differentiation, and depth of knowledge.

From this discussion, it can be seen that the essence of knowledge work entails information processing and the generation and application of knowledge (Mohrman et al.,
Knowledge work is frequently carried out by individuals with highly developed and specialized knowledge bases (Mohrman et al., 1995) who are often professionally individualistic (Pava, 1986). Knowledge work is generally complex as multiple processes may need adjustments due to the uncertainty of the cause-effect relationships of the processes, and thus is emergent, varied, uncertain, and dynamic (Mohrman et al., 1995); the development of knowledge work is often nonlinear and can be characterized by nonsequential conversion flows, and multiple, concurrent conversion processes (Pava, 1986); and the needs of knowledge workers may be different from other workers (Purser & Pasmore, 1992; Von Glinow, 1988).

Further, characteristics of production-based settings were discussed in terms of sociotechnical systems theory. Production-based settings were characterized as open systems that must interact with their environments to survive. Further, social and technological characteristics of production-based systems were described and the import-conversion-export cycle was discussed. A brief critique of sociotechnical systems theory was presented and the theory was analyzed in terms of problems applying the theory to knowledge-based work systems.

Lastly, it was argued that the benefits of separating the technological and social systems of knowledge-based systems is unclear. Instead of social and technological systems, it was proposed that these systems be considered one system—the socio-cognitive system—since many of the technological components of Purser and Pasmore’s (1992) theory appear to be descriptive labels of knowledge-work or more easily explained by social processes. It was also argued that many aspects of the
technological components identified by Purser and Pasmore should be operationalized as support systems. This may make sociotechnical systems theory more useful for production- and knowledge-based settings, since organizational support is specifically identified and the benefits of these support systems can be empirically evaluated.

Models of Work Team Effectiveness

In the next section of this paper, models of effective teams are presented. The intent of this section is to identify additional systems that support effective team-based organizations. It is unclear, however, to what extent the following models apply to teams in knowledge-based work settings, since many of the following models were developed before differences between knowledge-based work and other types of work was addressed in the work team literature. Two models that may assess effectiveness of knowledge-based work settings include Cohen's (1994) and Sundstrom et al.'s (1990) models. For instance, Cohen argued that the domain (e.g., manufacturing or service setting) does not matter, as long as team design fits the work process and organizational strategies; and in their article, Sundstrom et al. differentiate between production- and knowledge-based teams. Neither Cohen nor Sundstrom, et al., however, clearly state if some components of their models or more applicable to one type of team over other types; their models were probably meant to apply to all types of teams. This is surprising given research suggesting that knowledge workers have different needs than production workers (Purser & Pasmore, 1998; Resnick-West & Von Glinow, 1988) and that team implementation in knowledge work settings produces a set of problems and issues
different from those produced when implementing teams in production-based settings (Mohrman et al., 1995; Pava, 1986; Purser & Pasmore, 1992).

The following sections discuss models of work team effectiveness described by Hackman and Morris (1975), Hackman (1987), Gladstein (1984), Shea and Guzzo (1987), May and Schwoerer (1994), Pearce and Ravlin (1987), Cohen (1994), and Sundstrom et al., (1990). These models of work team effectiveness are described and used to identify systems which may facilitate team-based work system effectiveness and employee collaboration.

Hackman and Morris' (1975) Group Effectiveness Framework

Hackman and Morris (1975) argued that group effectiveness should be viewed in terms of ongoing interaction processes between group members during task performance. By identifying, measuring, and changing aspects of group interaction, groups can become more effective. The difficulty, however, is in discovering which group interaction processes lead to more effective performance. Hackman and Morris' model is illustrated in Figure 4.

**Input-Group Process-Performance Relationships**

Hackman and Morris (1975) structure their discussion in terms of the initial state of the task-oriented group (e.g., input factors such as individual skill level or trust between group members), the interaction processes of the group (e.g., how well the group accepts input from all its members), and the group's performance effectiveness (e.g., quality or errors). Further, input factors (e.g., the initial state of the group) are hypothesized to affect outcomes through the interaction processes of the group, since a
highly cohesive group that performs better than a less-cohesive group might have more effective interaction processes. Hackman and Morris reported three general types of interaction processes: (1) input-process relationships; (2) process performance relationships; and (3) the full input-process-performance sequence.

Figure 4. Hackman and Morris' (1975) Group Effectiveness Framework.

From their review of the literature, Hackman and Morris (1975) reported several input factors which affect process variables, including leader attitudes, group member personality characteristics, group size, group structure, group history or experiences, and group tasks. Factors that affect process-performance relationships include the process through which solutions proposed by group members are selected or rejected. To study input-process-performance relationships, Hackman and Morris used 144 different group tasks—production, discussion, and problem-solving tasks—administered to 108 experimental groups. Results suggest that task type was found to significantly affect interaction processes and task type was found to affect performance. However, results
never clarified the substantive nature of the input-process-performance relationship. Hackman and Morris reported several other studies with the same lack of specific input-process-performance relationships. Finally, Hackman and Morris argued that integration coding systems, the summary measures used in coding systems, inconsistencies between tasks, different research settings, and different cultural norms, are methodological problems which may limit the ability of small group research to find significant results.

**A New Approach to Group Research**

To meet methodological concerns, Hackman and Morris (1975) offered three new approaches to research on group effectiveness: (1) a differentiated view of group interaction functions (e.g., the purpose of the group interaction in meeting group performance) which affects; (2) how input factors are altered to improve group effectiveness; and (3) a new research strategy. For example, interaction functions in groups might be characterized by three general summary variables: (1) effort on tasks; (2) performance strategies; and (3) knowledge and skills. By influencing these summary variables, group effectiveness can be increased.

**Group Interaction Functions**

Further, Hackman and Morris (1975) stated that group interaction variables can affect group member effort on tasks, group member performance strategies, and the knowledge and skills of group members. For instance, group interaction can decrease or increase task effort, can lead to effective or ineffective task performance strategies, or group interaction can be affected by the attributes of the performed task. The importance
of the summary variables to different group tasks can also affect group performance. For example, some tasks may depend more on group effort than task performance strategies. Additional characteristics of the summary variables--group member effort on tasks, group member performance strategies, and the knowledge and skills of group members--are discussed in further detail below.

**Group effort on tasks.** According to Hackman and Morris (1975) group interaction appears to affect the group's effort in two ways: (1) by the coordination of efforts; and (2) through the level of effort expended on tasks. Coordination affects effort by ensuring that member's efforts are not wasted. Maximizing the efforts of group members can be facilitated by the group's coordination strategy, which should be make explicit in the group interaction process so that the nature of the coordination efforts are obvious to group members. Group size, however, can increase coordination needs and can result in the loss of group process potential (Steiner, 1972). Group member efforts can also decrease as group size increases (Steiner, 1972). Additionally, interaction processes can either motivate or demotivate individual levels of effort in accomplishing tasks, and can change over time (Hackman & Morris, 1975). For instance, reinforcing task-oriented efforts may increase the individual's efforts to perform tasks.

**Task performance strategies.** Hackman and Morris (1975) defined strategy as collective choices group members make about performing tasks. Strategy includes choices made about performance outcomes and the methods chosen to meet these outcomes. Task contingencies, however, need to be addressed when determining strategy, because the nature of the task will determine if strategy is more or less
important. For example, task performance strategies might be different if the group's product is a script for a humorous play versus a new project proposal presented to executive management.

Additionally, Hackman and Morris (1975) asserted that there are two ways interaction process affect performance: (1) the existence of preexisting shared strategies; and (2) the reformulation of existing strategies or the development of new strategies. For instance, groups with existing strategies may implement the strategy without discussion, so that group interaction processes serves as a vehicle for implementing preexisting performance strategies. Group norms, however, often limit a group's ability to use strategy planning or to examine the nature of the task to develop or modify existing strategies. Interaction processes, then, which encourage group norms of exploring strategic planning, may increase group performance effectiveness.

Knowledge and skills. Hackman and Morris (1975) contended that group interaction processes affect group member's knowledge and skills and how knowledge and skill is used to perform tasks. For instance, group interaction processes affect knowledge and skills of group members in two ways: (1) the process of evaluating and weighting contributions of group members who may possess different levels of knowledge or skill needed to accomplish tasks; and (2) by creating conditions that increase the overall group's knowledge and skill for addressing tasks.

For example, Hackman and Morris (1975) stated that interaction processes which ignore the talents, knowledge, and skills of group members may decrease the ability of the group to perform tasks. Whereas some tasks may be simple, and the needed
knowledge and skills are obvious to the group, more complex tasks may require more sophisticated social processes to identify needed knowledge and skills. Group interaction processes can also be structured so that group members work together to gain knowledge or skills which were not previously available to the group.

Input Factors and Group Performance

Another suggestion offered by Hackman and Morris (1975) was to change the role of input factors and group performance in group research. For instance, input factors can consist of: (1) the structure of group norms; (2) the group task design; and (3) the group composition in terms of characteristics and the histories of group members. Further, Hackman and Morris claimed that the three summary variables (group member effort on tasks, group member performance strategies, and the knowledge and skills of group members) are responsive to input variables changes in three ways: (1) group norms can be modified to make performance strategies more appropriate to the task; (2) group tasks can be redesigned to increase member effort; and (3) group composition can be changed to increase the level of knowledge and skills within a group and the ability of the group to use available knowledge and skills. These three areas are further discussed below.

Group norms. Hackman and Morris (1975) asserted that performance strategies are often well-established behavioral norms which save groups time when performing tasks. However, some circumstances require new performance strategy norms, since existing strategies might decrease task performance. Groups can increase their awareness of task performance strategy norms by group process consultants or other methods. For example, groups can set time limits on discussing items, separate the generation from
evaluation of ideas, analyze tasks before performing them, use mechanisms for exchanging ideas and information, or set aside time to identify factors or potential obstacles that may impede implementation of solutions. Another strategy is to have group members discuss task performance strategies before task performance, and consider revising or replacing task strategies.

Task redesign. Hackman and Morris (1975) argued that many task-effective strategies lie outside of group responsibility (e.g., members do not have the resources available to implement the most effective task strategy). Task-redesign, however, can be effective if group members find task performance motivating, and norms are developed that increase task performance. For instance, five job dimensions that can increase motivation for performing tasks include: (1) skill variety—the extent to which individuals perform multiple jobs using valued skills; (2) task identity—whether individuals perform a whole, complete, or visible portion of work; (3) task significance—the extent to which results from job performance affect psychological or physical well-being; (4) autonomy—the degree to which an individual has discretion and personal initiative in performing tasks; and (5) feedback—the degree to which an individual learns about his or her job performance (Hackman & Oldham, 1980).

Group composition. Hackman and Morris (1975) maintained that group composition can determine if groups utilize individual knowledge and skills when performing tasks, since groups composed of competent team members will perform more effectively. However, groups have problems when composed of individuals with different levels of competence. Access to talent can be lost if interpersonal issues, such
as competitiveness or differential status, interfere with group member's ability to appropriately weight and evaluate group member knowledge and skills. Moreover, openly dealing with interpersonal issues can be highly threatening and increase anxiety in groups. To help solve some of these problems, Hackman and Morris (1975) proposed that long-term process consultation or team building be used to increase trust in the group and to reduce threats in group settings. Thus, to improve performance, competent group members and changes in the interpersonal skills of group members are needed.

Summary

Hackman and Morris (1975) proposed that: (1) group interaction processes affect group productivity; (2) input variables, group composition, group norms, and group task design, affect group process and the performance of the group directly; and (3) three summary variables, knowledge and skills, effort, and performance strategies, affect group performance. Hackman and Morris' model of team effectiveness appears to focus primarily on group interaction factors. Further, many of the organizational systems identified from their model seem highly applicable to knowledge-based work systems given the individualistic professionalism of knowledge workers (Pava, 1986) and the difficulty knowledge workers have communicating with individuals possessing different expertise (Mohrman et al., 1995). However, other group effectiveness models identify additional organizational factors that may be appropriate for an instrument assessing system effectiveness for team-based organizations.
Hackman's (1987) Normative Model

Hackman (1987) refined and elaborated on previous research in his normative model of group effectiveness by identifying organizational context variables that facilitate components of group effectiveness. The normative aspect of Hackman’s model refers to a model of group effectiveness which identifies factors that enhance or decrease the ability of a group to perform tasks. The model is meant to apply to “social systems complete with boundaries and differentiated roles among members” (p. 322); groups that perform one or more tasks which are identifiable and potentially measurable; and groups that function within an organizational context. Hackman's model is presented in Figure 5.

Figure 5. Hackman’s (1987) Normative Model of Contextual Group Factors and Group Effectiveness.
Effectiveness Criteria

Hackman (1987) uses three criteria to assess team effectiveness—the groups output, the status of the group as a performing unit, and the effect of the group on individual members. For example, group outputs can be measured by determining the extent to which they meet or exceed performance standards of the group's customers. Measurement of output criteria in this manner is important, since objective criteria are rarely available for work teams, and groups are usually affected more by the assessment of a group's performance than objective measures. Further, the status of the group as a performing unit can be measured by the effectiveness of social processes that enhance or maintain the ability of group members to work together on future tasks. Groups that decrease effective interpersonal relationships in performing tasks will be ineffective on future tasks. Finally, effective groups will have experiences that satisfy individual needs. Groups that frustrate individual efforts will probably be less effective over time.

Overall Effectiveness

Hackman (1987) stated that the overall effectiveness of groups is dependent upon three factors: (1) the collective effort of group members to perform tasks; (2) the degree to which group members have the knowledge and skills to perform tasks; and (3) the extent to which performance strategies are appropriate for task performance. Additionally, Hackman used these process criteria as a basis for discussing three components of effective groups: appropriate group design, a supportive organizational context, and positive aspects of group synergy. Positive group synergy exists when groups receive more gains from process interactions than losses. Negative group synergy
occurs when process interactions produce more losses than gains. For instance, positive synergy created from good social process skills of group members can help the group overcome less than optimum working conditions. Hackman’s process criteria of effectiveness--group member efforts at task performance, group member knowledge and skills, and task-appropriate performance strategies--are discussed in more detail below.

**Conditions Increasing Task Effort**

Hackman (1987) argued that conditions increasing task performance effort include: (1) a motivating task; (2) an organizational reward system that reinforces group achievements and which provides challenging objectives; and (3) group interaction processes that minimize “social loafing” and increase shared commitment. Social loafing refers to decreased individual effort when performing in groups (Latane, Williams, & Harkens, 1979). The following discusses these three conditions increasing task performance effort in more detail.

**Group design and task performance effort.** Hackman (1987) claimed that individual motivation for task effort can be increased by developing tasks so that: (1) individuals are required to use high-level skills; (2) individuals can be responsible for a whole and meaningful piece of work; (3) task outcomes are perceived as important to the organization and customer; (4) group members have autonomy in performing tasks; and (5) group members receive regular feedback on task performance. Further, Hackman stated that effective groups have performance norms that emerge from group tasks which are “owned” by the group, important to the organization, and challenging.
Organizational context factors and task performance. In addition to team design variables, Hackman (1987) offered organizational context factors that increase task effort, including specific and challenging performance objectives, positive consequences for good performance, and rewards for group performance. For instance, challenging performance objectives might include information about the date which work must be done, the items which must be produced, and the quality level of the items. Further, a reward system that recognizes and reinforces appropriate group performance can complement a good task design and task efforts. The types of rewards can depend upon the values of the group, since some group members might prefer monetary rewards over recognition of good performance. Reward systems should also be clear--groups should understand that rewards will only be reached if they perform well. Finally, rewards should be focused on the group level and not the individual level, since individually based rewards often lead to reinforcement of individual efforts instead of group efforts.

Group process factors and task performance. Hackman (1987) asserted that group synergy can increase task performance effort in two ways: (1) by minimizing the waste of team time, energy, and talent; and (2) by increasing individual commitment to the team. For example, coordination, integration, and other group needs, can reduce the performance potential of the group (Steiner, 1972). Groups that are too large can suffer from social loafing--group members contribute less to task performance (Latane et al., 1979). Further, Hackman argued that teams can develop shared commitment and increase efforts toward completing tasks even when conditions are challenging. Commitment in groups is apparent when team members value membership in the group.
and find collaborative team work rewarding. Managers can also increase team commitment through methods such as team-building activities.

Conditions Supporting Knowledge and Skill

Conditions that increase the pool of group member knowledge and skill include a group composed of members with the appropriate mix of skills, education systems that complement existing knowledge and skills, and systems that appropriately weight contributions to the group and that develop expertise of all individuals in the group. The following addresses these conditions for supporting knowledge and skill in groups in more detail.

Group design and knowledge and skill. Hackman (1987) argued that appropriate group design supporting team knowledge and skills includes a team composition with the appropriate expertise, the appropriate group size, group member interpersonal skills, and group member diversity. For instance, individuals with expertise needed to accomplish group goals should be assigned to the group from the beginning; group size should be appropriate to the task; and group members need interpersonal skills to focus the task skills of group members upon the project. The knowledge and skills available to group members can also be facilitated by having a moderately diverse group membership. Groups that are overly homogeneous may function well together, but may not have the needed resources. Groups that are overly heterogeneous may have the resources for task performance, but cannot work together effectively.

Organizational context variables and knowledge and skills. Hackman (1987) proposed that education systems can be developed by organizations to increase groups’
knowledge and skills. Educational system provide information resources that help groups develop knowledge and skills required for task performance. Further, Hackman argued that two conditions must exist for an educational system to be useful. First, the educational resources--training and technical consultation--must exist within the organization. Second, a educational delivery system must be in place that is accessible by team members. The type of delivery system will depend on task requirements and the needs of the group. For example, groups may need continuing consultation, an occasional training program, or one-time only consultation.

**Group synergy and group knowledge and skills.** The last component identified by Hackman (1987) to increase group member knowledge and skills is group synergy. Group synergy can increase the knowledge and skills available to group members by developing interaction processes that use group member contributions appropriately and which develop mechanisms to increase collective learning. Appropriate weighting of group member contributions occurs when the group solicits and weights individual members' contributions according to their expertise. Expertise can be lost when contributions are minimized because of other considerations, such as demographic attributes (e.g., gender) or behavioral style (e.g., dominance). Group member knowledge and skills is facilitated when group members learn from each other and the total amount of talent available in the group is increased. However, to increase the general learning within groups, mechanisms must be in place to focus the group on learning collectively and to sharing individual expertise with other group members.
Conditions Increasing Appropriate Performance Strategies

Hackman (1987) argued that conditions can be developed to support the appropriate use of performance strategies by groups. For instance, the appropriateness of task performance strategies can be increased by appropriate group norms, information systems that make needed data available, and group interaction processes that effectively implement performance strategies and increase creative solutions to task performance. Norms, information systems, and group interactions processes that support appropriate performance strategies are discussed in more detail next.

Group design and task performance strategies. Hackman (1987) proposed that group design can increase the appropriate selection of performance strategies by developing norms that facilitate the selection of task-appropriate strategies. Norms help groups talk about strategies for performing familiar tasks and identify appropriate strategies and help groups select appropriate task execution strategies. For example, norms can help groups self-regulate group member behavior so that performance strategies are chosen and implemented appropriately. Norms may be more likely to enhance self-regulation in groups if they are intense (i.e., adherence to the norm provokes a high approval or disapproval response) and when they are crystallized (i.e., high levels of agreement among group members on appropriate behavior) (Jackson, 1965). Further, group norms can be established that help groups develop task performance strategies appropriate to the situation. Groups do not spontaneously discuss strategy appropriateness; however, groups members that must coordinate their work benefit when they consider alternative performance strategies (Hackman, Broussea, & Weiss, 1976).
Group norms can facilitate situation scanning and strategy planning by developing habits (Hackman, 1987).

Organizational context variables and task performance strategies. Hackman (1987) argued that organizational information systems can increase task-appropriate performance strategies. For instance, important information includes parameters of the performance situation; requirements and constraints in performing tasks; information about the availability of material resources; and information about customers and their needs. Further, information can be provided which alerts groups to consequences of implementing different task performance strategies; and information processing tools can be provided to organize data and compare and evaluate alternatives. For example, groups may need information on product demand or costs of production processes. Additionally, groups need data that meets their level of autonomy and decision-making power, since groups developing performance strategies and performance processes will need more data than groups who receive direction from management. Managers should also ensure that data is realistically available to groups and should provide only the necessary data. If data is unavailable, managers should make groups aware that they are working with incomplete data. Organizations can provide groups with the minimal data needed and let groups decide what additional information is required.

Group synergy and task performance strategies. Hackman (1987) argued that group synergy can facilitate efficient implementation of task performance strategies and the development of innovative strategic plans. For instance, effective group process skills can help development of strategic implementation plans and reduce inefficient use of time.
or energy; can help development of norms that increase use of strategy-appropriate plans and use of information systems; and can facilitate the development of innovative and creative performance strategies. Groups can develop norms that increase identification of new resources, new methods of circumventing obstacles, or new problem-solving strategies.

Summary

Hackman's (1987) normative model of group effectiveness builds on the work of Hackman and Morris (1975) by offering organizational level variables that develop group conditions increasing task effort, knowledge and skills, and task-appropriate performance strategies. Hackman based his model on previous research; no data is offered to support his model. Further, Hackman claimed that his model applies to “social systems complete with boundaries and differentiated roles among members” (p. 322); groups that perform one or more tasks which are identifiable and potentially measurable; and groups that function within an organizational context.

Using these criteria, Hackman’s model appears to apply to knowledge-based teams. However, some of the variables identified by Hackman--multi-skilling and task design to support a variety of high-level skills--may not be applicable to knowledge-based teams (Mohrman et al., 1995). Nonetheless, many of the variables identified by Hackman appear useful in a questionnaire assessing an organizations support systems for work teams.

Gladstein (1984) offered a model of group effectiveness based on three broad components—inputs, process, and outputs. Gladstein’s model is intended to identify variables that increase team performance and team member satisfaction, and to identify variables predicting team effectiveness. Gladstein based her model on previous research and tested her model on 100 sales team in the communications industry. Gladstein’s model is presented in Figure 6.

Figure 6. Gladstein’s (1984) General Model of Group Behavior.

A criticism of Gladstein (1984), however, is that elements of her model need more elaboration and explanation. For example, group composition variables, particularly heterogeneity, job tenure, and organizational tenure, need clarification and elaboration. Further, Gladstein’s research results are difficult to interpret without the questionnaire
items, which were not published with the article. The three broad components of Gladstein’s model--inputs, process, and outputs--are discussed in more detail below.

Inputs

Gladstein (1984) classified inputs into two types: group level and organizational level inputs. Group level inputs were divided into: (1) group composition, including adequate skills, heterogeneity, organizational tenure, and job tenure; and (2) group structure, including role and goal clarity, specific work norms, task control, size, and formal leadership (task leadership, maintenance leadership, and the influence of leadership higher in the organization). Organizational level inputs were divided into: (1) available resources, including training and technical consultation, and markets served; and (2) organizational structure, which consists of rewards for group performance and supervisory control.

Process

The process component of Gladstein’s (1984) model included group process variables and a moderator variable. Group process variables included: (1) open communication of ideas; (2) supportiveness; (3) low interpersonal conflict; (4) the discussion of performance strategies when addressing new situations; (5) weighting of individual inputs by knowledge and skill; and (6) boundary management (interdependencies with groups on "daily" basis and interdependencies with groups on a project basis). The moderated relationship component of the model included task complexity, environmental uncertainty, and interdependence.
Outputs

Gladstein (1984) proposed that outputs consist of group effectiveness which includes: (1) performance (revenue and self-rated performance on problem-solving, decision-making, and work performance); and (2) satisfaction (satisfaction with the team; satisfaction with the work, including the compensation system evaluation system, advancement, and workload; and satisfaction with serving customers and meeting customer needs).

Test of Model

To test the model Gladstein (1984) received questionnaires from 661 individuals employed in the marketing division of a communication firm. A description of the subject's work processes and job tasks were not included in the article. Thus, it is difficult to deduct if the workers were performing knowledge- or production-based work or to determine if subjects worked in naturally occurring groups or in teams. LISREL IV structural equation modeling was utilized to test all relationships of the model simultaneously, and to determine if process behaviors affected group effectiveness when group structure, group composition, and organizational-level variables were included. Confirmatory factor analysis was used to determine construct components and the variables of these components.

Results

Results from Gladstein's (1984) research suggested that group effectiveness variables--actual sales and subjective reports of performance and satisfaction--were not significantly related. Satisfaction scales, however, were highly related to subjectively
rated performance. Group process clusters were found to consist of intragroup processes and boundary management. The group structure scales were found to form three clusters including size, leadership, and structuring of activities. Size did not significantly correlate with other scales. The leadership scales were strongly related, suggesting that leadership was a separate cluster, consisting of roles, goals, norms, and task control.

Further, results from confirmatory factor analysis suggest the following construct components and variables for the model. The original group process construct was found to consist of two construct components, intragroup processes and boundary management. Intragroup processes included open communication, supportiveness, conflict, the weighting of individual's contributions, and the discussion of strategy. Boundary management consisted of the extent to which there were misunderstanding with external groups. The original construct of group structure was found to consist of the construct components of size and leadership structuring of activities. The variable that made up the size construct consisted of size only, and the variables that made up the leadership structuring of activities consisted of leadership activities, goal and role clarity, norms concerning work procedures, and task control. Finally, the original group effectiveness construct consisted of two construct components, performance and subjective effectiveness. Performance consisted of actual sales revenue and subjective effectiveness consisted of group effectiveness and member satisfaction (Gladstein, 1984).

Further, Gladstein's (1984) model predicted that group task characteristics—open communication, discussion of performance strategies, and boundary management—would moderate the relationship between group process and group effectiveness. No support
was found for this prediction. Results suggested that self-reported effectiveness is a function of intragroup process, leadership, training, and organizational experience. Sales revenue was a function of organizational experience (negative relationship) and market growth. Intragroup process was a function of leadership, structuring of activities, rewards (negative relationship) and size (negative relationship). Leadership was a function of rewards (negative relationship). And structuring of activities was a function of rewards, skills, mix, and size. From these results, Gladstein (1984) argued that self-reported effectiveness is highly related to many team building activities, such as open communication, supportiveness, active leadership, training, and experience in the organization. Further, many employees may wrongly attribute performance to their own experience and group interactions when market and other variables actually determined sales revenue. This has implications for organizations, since different organizational constituents may need to make explicit their criteria for effectiveness.

Further, Gladstein’s (1984) research suggests that groups see boundary behaviors (behaviors needed to interact with the group’s environment) as separate from internal activities. Thus, group managers may be spending time on the wrong activities. Instead of focusing on internal group behaviors, managers may need to spend more time in external group activities such as negotiating objectives for the group or promoting group outputs to top managers. Thus, another organizational support systems is mechanisms that alert managers to the importance of managing external boundaries (e.g., negotiating objectives or promoting the group).
Lastly, organizational variables were found to directly or indirectly influence group effectiveness. For instance, market growth was related to sales revenue, which highlights the importance of an organization's strategic planning process. Also, teams may not have control of their output levels if the market is stagnant. Rewards was found to be most related to group leader behaviors and how work was structured within a group. Rewards were positively related to the control of tasks, goal and role clarity, group norms, and leadership and maintenance activities. Training and technical consultation were positively related to self-reports of group effectiveness. Gladstein (1984) concluded that more attention needs to be placed on the group's organizational environment. "The behaviors needed for the group to adapt to the organizational environment and the organizational context variables that mold group behavior are often ignored. In a broader conceptual scheme, the organization could be examined as a context variable influencing group behavior" (p. 514).

Summary

Gladstein (1984) offers a useful model of team effectiveness based on group and organizational level inputs, group process variables, and outputs. Her research supports the importance of organizational level structures that support teams and identifies several support structures that should be evaluated when assessing organizational support systems. However, the components of Gladstein's model could use elaboration, and it is difficult to determine whether her model is more applicable to all or a subset of teams (e.g., production- or knowledge-based teams).

Shea and Guzzo (1987), based on their literature review and personal experience, stated that three variables—task interdependence, outcome interdependence, and potency—are important for group effectiveness. Further, Shea and Guzzo argued that task interdependence, outcome interdependence, and potency can influence group performance and can be influenced by group members or other individuals, such as managers. Task interdependence refers to the extent that interactions among individuals within the group are task-driven (e.g., group members may work independently, may pass tasks to other group members sequentially, or may interact to produce work). Outcome interdependence refers to the extent to which shared consequences within a group result from task accomplishment. Outcomes are not benefits received from working as a group (e.g., benefits from social interaction) but are provided by individuals outside the group (e.g., rewards, punishment, pay, promotion, skill acquisition, exposure, or survival). Potency refers to the collective belief that the group can be effective and is a function of the group's belief that the group possesses the necessary tools for success (e.g., training, skills, talent, money, time, access to resources, and feedback). Potency is linked to performance by feedback. For example, if the group receives positive feedback, then the group may believe in its future effectiveness. Finally, potency and task interdependence are related, since interactions among group members provides opportunities for evaluating group skills, which may change task organization among group members.

Shea and Guzzo's model is presented in Figure 7.
Organizational Approaches to Task Interdependence, Outcome Interdependence, and Potency

Shea and Guzzo (1987) suggest that how organizations approach task interdependence, outcome interdependence, and potency will affect group performance. For instance, groups will not maintain effective performance if the degree of outcome (i.e., the meaningfulness, the equalness, and the competitiveness) interdependence is absent. If task performance requires group interaction, but rewards are based on individual contributions (outcome interdependence), then individual success--and "undercutting" other group members--may become more important than cooperation; a group tasked with solving a problem four previous groups could not solve (low potency) will probably fail--individuals may spend more energy attempting to leave the team than complete the project; and if task performance requires cooperation (task interdependence) and rewards are distributed competitively, the group will probably fail.
Implications for Management

Implications for managers include: (1) setting a clear charter that helps groups know what success looks like and that helps groups define their goals and focus on the group's interdependence; (2) determining what resources are necessary and are available for meeting group goals; and (3) structuring the group so that jobs are interdependent and rewards are distributed dependent on group performance. Task and outcome interdependence should be aligned or group members should have the opportunity to perform work independently. Additional implications of the model for managers include: (1) task interdependence, outcome interdependence, and potency may be used to diagnose the potential performance of groups; (2) group members desire to change job descriptions, policies, and procedures may reflect the group's response to outcome interdependence; (3) the management style suggested by this model is a facilitative style with a specific focus and the willingness of managers to intervene; and (4) managers must attempt to comprehend and address group opinion because if the group believes that an issue is present, then the issue exists.

Test of Model

To test their model, Shea and Guzzo (1987) administered questionnaires measuring task interdependence, potency, and outcome interdependence, to 435 salespeople in a large, national, retail corporation. Subjects were clearly interdependent on pay—the questionnaire was administered again after a bonus plan, based on group performance, went into effect—and had some decision-making responsibility. However, it is unclear if subjects performed knowledge- or production-based work and it is unclear if
subjects met other criteria for a team. Increased sales and an internal measure of
customer service, were used to evaluate the effectiveness of the group bonus plan.

Results

Results suggested that outcome interdependence increased significantly and a
change was observed in work group interaction patterns (explained below). Potency and
outcome interdependence were significantly related to higher customer service. Increased
sales, however, was not related to changes in task interdependence, outcome
interdependence, or potency. Shea and Guzzo offered three explanations for this result:
(1) the overall impact of the bonus plan change may have hidden the effect upon
individual groups; (2) customer service behaviors may be a better measure of group
performance, because groups can control good service but cannot make customers buy
products; and (3) external factors may have influenced the 28 percent sales gain.

Other results suggest that potency is an immediate determinant of a group's
effectiveness, since potency was strongly related to customer service before and after the
bonus plan was implemented. Potency was also positively related to task
interdependence, suggesting that task interdependence could be changed. Note, the
group's task was not highly dependent on technology. Group rewards were also found to
decrease "blocking" behaviors (e.g. blocking another individual's sale to a customer),
while facilitating and producing behaviors increased. Instead of blocking or hindering
other group member's work, individuals appeared to provide assistance in selling. Groups
with more blocking behaviors had lower sales whereas groups with facilitative behaviors
had higher sales. Involvement in decision-making was also found to increase group potency (Shea & Guzzo, 1987).

**Summary**

Shea and Guzzo (1987) presented evidence they claimed support the components of their team effectiveness model — task interdependence, outcome interdependence, and potency (see Figure 7). To enhance team effectiveness, Shea and Guzzo suggested that managers should: (1) closely attend to the type and extent of outcome interdependence; (2) attempt to enhance group potency through training, feedback, task interdependence, developing new skills, and providing resources; (3) allow groups to develop their own task-driven interaction patterns; and (4) attempt to use multiple, comprehensive, performance measures because less comprehensive measure may produce confusion on goals and expectations. Although it is unclear whether Shea and Guzzo’s model extends to knowledge-based teams, their model offers several variables that should be determined in assessing an organization’s systems for knowledge-based collaborative work systems.

**May and Schwoerer’s (1994) Model for Fostering Work Team Efficacy and Effectiveness**

May and Schwoerer (1994) offered a model of team effectiveness based on efficacy— the "team members' collective belief in their capability to perform their job" (p. 30). Team efficacy is enhanced by appropriate team design and an appropriate organizational context (see Figure 8). Teams develop efficacious beliefs by comparing the extent of their job requirements with personal resources, situational resources, and environmental constraints. Team efficacy can also be increased by emphasizing content
(i.e., factors relevant to performing job tasks) and process issues (i.e. factors relevant to relationship issues between team members) in groups.

May and Schwoerer's (1994) Model for Fostering Work Team Efficacy and Effectiveness.

Model Overview

May and Schwoerer's (1994) argued that organizational context and team design variables are primary influences on team efficacy and effectiveness. Further, May and Schwoerer use Bandura's (1986) sources of self-efficacy information--enactive attainment, vicarious experience, verbal persuasion, and physiological state--to explain how organizations affect team efficacy. Thus, organizational context and team design variables depend on four additional factors that affect team efficacy: (1) successful team experiences; (2) team member modeling behaviors; (3) verbal encouragement; and (4) team members' interpretation of stressful experiences. Successful job experiences includes team accomplishments that increase confidence about performing jobs effectively (e.g., teams should be exposed to opportunities that challenge, but do not
overwhelm, and that gradually build skills and coping abilities). Through social modeling, individuals learn from other team members about how to successfully or unsuccessfully perform tasks. Verbal encouragement refers to team members or managers that provide verbal support, and interpretation of stressful events refers to the negative or positive aspects of a situation and its impact on a team—limiting negative assessments of performance capability can maintain high levels of team efficacy. In addition, May and Schwoerer (1994) proposed that a reciprocal relationship exists between team efficacy and beliefs of team efficacy: (1) influences on team efficacy affect the beliefs of team efficacy (e.g., a manager that screams at employees may lower employees' belief that they can adequately perform jobs); and (2) beliefs of team efficacy influences effects of team efficacy (e.g., employees that believe they will be screamed at may reduce their job efforts or may experience high levels of stress).

The following further discusses the four information influences adapted from Bandura (1986)—successful job experiences, modeling, verbal encouragement, and interpretation of stressful situations—and organizational context and redesign variables that support team efficacy and team effectiveness (May & Schwoerer, 1994). From this discussion, systems are identified which may team-based work organizations and employee collaboration.

Successful Team Experiences

Organizational context variables that support successful team experiences include: (1) the development of education and training systems that use job-related situations as examples and that allow for feedback under "low-cost", controlled circumstances; (2) the
development of systems that provide the necessary information for good decision-making and which provide timely feedback on job performance; (3) establishment of a reward system based on skill acquisition (e.g., pay-for-knowledge); and (4) the development of systems that provide the tools and materials needed by team members to perform their jobs (May & Schwoerer, 1994). Team design variables that support successful team experiences include: (1) a team composition that includes individuals with the necessary abilities and which can learn job-appropriate skills via training; (2) a team composition that matches the task complexity with group member's skills; (3) a team design that minimizes team member's job uncertainty; and (4) a team design that provides team with incrementally difficult job tasks so that teams can gain experience and efficacy over time (May & Schwoerer, 1994). These variables appear highly pertinent to an instrument assessing supportive organizational systems for work teams.

Modeling

Organizational context variables that support team member modeling include: (1) the use of high-performing teams as models during training and skill acquisition; (2) the development of information systems that select appropriate teams as role models; and (3) the development of reward systems that advertise and promote high-performing teams for use a role models. Team design variables that develop team member modeling include: (1) the composition of teams so that members are similar on some characteristics but have different levels of general and functional experience appropriate to the interdependence needs of the team; and (2) the development of a cooperative atmosphere so that teams
can learn from each another (May & Schwoerer, 1994). These variables may also be of assistance in assessing organizational support systems.

**Verbal Encouragement**

Organizational context variables that support verbal encouragement include: (1) behaviors that persuade and encourage team members via highlighting success and behaviors that champion the team approach; and (2) a mentoring system that trains experienced team members to give credible support and encouragement to peers. Team design variables that support verbal encouragement include: (1) the selection of team members who can provide appropriate coaching skills and that can train team members to acquire coaching skills; (2) the design of team tasks so that team members interact; (3) the development of team cultures which promote the free exchange of ideas; and (4) team design that tracks and changes negative statements about the team's performance (May & Schwoerer, 1994). Again, these variables seem highly applicable to the goals of this paper.

**Negative Interpretation of Stressful Experiences**

Organizational context variables that minimize the impact of negative interpretation of stressful experiences include: (1) training that provides team members with appropriate skills (e.g., technical skills, interpersonal skills, and stress management skills); (2) a reward system that is clear, unambiguous, and that includes mechanisms for utilizing employee input when determining evaluation criteria; (3) information about the team's environment, so that team members have accurate performance attributions; (4) a supportive organizational climate and strong communication lines between elements of
the organization; (5) a physical environment that minimizes stress-producing distractions and interruptions; and (6) a job structure that minimizes physical and psychological risks. Team design variables that reduce the negative interpretation of stressful experiences include: (1) skills training that emphasizes relationship building and communication; and (2) a team design that matches job uncertainty and complexity with team member's skills (May & Schwoerer, 1994). These variables are useful criteria for assessing organizational systems that support work teams.

Summary

May and Schwoerer (1994) offered a model of team efficacy, based on an adaptation of Bandura's (1986) four informational influences on efficacy beliefs: (1) successful team experiences; (2) team member modeling behaviors; (3) verbal encouragement; and (4) team members' interpretation of stressful experiences. Further, May and Schwoerer presented organizational context and team design variables under each of the informational influences that may support team efficacy.

May and Schwoerer (1994) offered no research to support their model, and they did not suggest whether variables from their model are more applicable to knowledge- or production-based teams. However, May and Schwoerer stated that their model is based on work team and individual self-efficacy research, and they offered examples of organizational processes, structures, and behaviors that appear to support their model. May and Schwoerer presented a number of variables influencing team effectiveness that may be useful in an instrument assessing systems supporting team-based organizations and employee collaboration.

Pearce and Ravlin (1987) offered a model of group effectiveness consisting of five broad areas: (1) preconditions; (2) process criteria; (3) group design; (4) activation; and (5) evaluation criteria. Pearce and Ravlin's model is based on field experiments addressing the design and implementation of teams in the U.S., laboratory research on groups, and studies of groups in organizations that were not considered teams. The laboratory research and the studies of groups in organizations was based on groups that had at least one of the following characteristics: (1) nonroutine decision-making; (2) a task that could be multi-skilled; (3) control over task assignments; and (4) a complete and identifiable piece of work. The following briefly discusses the five components of their model--preconditions, process criteria, group design, activation, and evaluation criteria. This discussion is used as a basis to identify systems that support team-based organizations. Pearce and Ravlin's model is presented in Figure 9.

Preconditions

Preconditions (conditions or factors that must exist) consists of three areas: task conditions, organization conditions, and personnel. Further, task conditions consists of two areas: (1) process uncertainty; and (2) meaningful organization at the group level. Process uncertainty refers to the ability of the team to make decisions about work process after inputs are received and the ability of the team to receive adequate information to make informed decisions. Meaningful organization at the group level refers to a task that
is meaningful or "whole" at the level of the team--tasks which are overly large or small are inappropriate for teams (Pearce & Ravlin, 1987).

Further, another precondition--organization conditions--is broken into two areas: (1) appropriate expectations; and (2) managerial support. Appropriate expectations refers to well-defined team performance expectations and to expectations that the team can succeed. Managerial support refers to supportive behaviors from management at all levels of the organization (e.g., behaviors that allow group autonomy over tasks and behaviors that are congruent with appropriate expectations). The last precondition area, personnel, refers to potential group members who regard autonomy as a positive outcome (Pearce & Ravlin, 1987).
Process Criteria, Group Design, and Evaluation Criteria

Another component of Pearce and Ravine's (1987) model of team performance is group process criteria, including: (1) a variety of member responses; (2) coordination of members; and (3) commitment to group. Pearce and Ravlin discussed the components of group design--open communication, heterogeneous composition, minimal status difference, flexible coordination, autonomy over task assignments, and rewards at both the group and individual level--using the process criteria of their model.

In general, Pearce and Ravlin (1987) suggested that group design influences the variety of inputs into the group needed for effective decision-making. For example: (1) open communication increases the number of ideas available from team members; (2) heterogeneous group membership increases the diversity of perspectives available to the group; (3) minimal within-group status differences aids in the ability of the group to communicate; (4) training facilitates information processing by improving decision-making and job skills; and (5) group member commitment facilitates individual participation in task processes. Coordination is central to proper team functioning, because the variety of team member responses must be focused for meaningful action to occur. Group design structures which increase coordination include minimal status differences between group members, autonomy, and reward structures. Minimal status differences help coordination by providing group members with additional decision-making flexibility. Autonomy, which includes authority and information to make decisions, increases group coordination by allowing the group to make decisions as close to the time which uncertainty occurs ("just-in-time" decision-making). Reward
structures assist coordination behaviors in groups by creating group goal-oriented activities and reducing conflict, and commitment provides teams direction and motivation to coordinate activities.

Further, Pearce and Ravlin (1987) proposed that team design components can facilitate commitment. For instance, group autonomy in making decisions increases the group's responsibility and commitment; a meaningful and whole piece of work will increase team member commitment, since the work is more motivating; group reward structures increase commitment by emphasizing superordinate goals; and individual reward structures increase commitment by identifying individual contributions to accomplishing tasks.

Thus, Pearce and Ravlin (1987) claimed that appropriate group design aids in the variety of resources which can then be used to focus on tasks. Whereas variety allows groups to focus resources in a way that meets the demands of uncertain environments, coordination and communication processes allows variety to be channeled into useful, goal-directed behavior. Pearce and Ravine argued that group process has the greatest influence on evaluation criteria—employee satisfaction, employee turnover, employee absenteeism, and employee productivity (Pearce & Ravlin, 1987).

Activation

The last component under Pearce and Ravlin's (1987) model, the activation phase, refers to the early states of implementing teams. Further, activating groups consists of two, complimentary processes: appropriate team design that provides opportunities for collaboration; and the development of norms that facilitate group functioning. Four
activation factors that can facilitate group functioning include: (1) publicized, external support; (2) training; (3) incentives; and (4) developmental stages. Publicized, external support assists in activating teams by highlighting managerial support and commitment to the program (e.g., interdepartmental communications about the team positively reinforce group members and help increase the status of the program). Training can develop appropriate interaction patterns resulting in good decision-making, task performance, and interpersonal skills. Incentives can be structured to facilitate group norms which may limit the effectiveness of skills training and can include mechanisms that support group appraisal of task-performance strategies. Coaching can also provide team members with incentives to rotate jobs and develop open communication skills. Finally, an awareness of group developmental stages allows group members to understand the challenges groups face over time. For example, Katz (1982) found evidence suggesting that groups composed of the same individuals over time tend to communicate less within the group and with external sources. Decreased communication was associated with decreased technical performance, since group members were not in contract with evaluation, information, and feedback mechanisms that may have contributed to higher performance. Thus, mature groups may need incentives, such as group membership changes, to reinstate communication between internal group members and individuals outside the group (Katz, 1982).

Summary

Pearce and Ravlin (1987) did not empirically test their model of team effectiveness. Further, they do not state if their model is applicable to all teams or a
subset of teams (e.g., production teams). Pearce and Ravlin argued, however, that their model advances the work team literature in three ways: (1) by integrating the role of task uncertainty into a model of team effectiveness; (2) by identifying team implementation preconditions which if not addressed, will lead to implementation failure; and (3) by identifying activation mechanisms that increase the likelihood of successful implementation. Task uncertainty, preconditions, and activation mechanisms seem useful criteria that may enhance an instrument assessing organizational support systems for teams.

Cohen's (1994) Model of Self-Managing Team Effectiveness

Cohen (1994) offers a model of team effectiveness based on four general components—a context that supports employee involvement, encouraging supervisory behaviors, group task design, and group characteristics—and three effectiveness criteria. Effectiveness criteria include team performance, member attitudes toward quality of work life, and withdrawal behaviors. The following discusses the four components of Cohen's model and identifies systems which may support team-based organizations and employee collaboration. Cohen's model is presented in Figure 10.

Group Task

Cohen's (1994) group task component is based on Hackman and Oldham's (1976) five components for task design—task variety, task identity, task significance, task autonomy, and task feedback. Task variety refers to a variety of skills necessary to performing work processes (Hackman & Oldham, 1976). Whereas division of labor
narrows the scope of skills necessary to performing tasks, task variety refers to broadening the scope of skills.

Figure 10. Cohen's (1994) Model of Self-Managing Team Effectiveness.

Task variety increases group member motivation and satisfaction by making the job more meaningful, because teams can rotate jobs and become skilled in performing a
variety of tasks. Task identify refers to a whole and identifiable task that group members perform from beginning to end and that allows group members to view work outcomes. Viewing the work from beginning to end increases motivation, since employees are more likely to view their job as meaningful. Task significance refers to the extent to which the task has a significant impact on other individuals inside or outside the organization. Employees are more likely to view their work as meaningful if their jobs are viewed positively by others. Task autonomy refers to group member discretion and independence when determining work processes and scheduling work. Autonomy increases motivation, because individuals are responsible for work outcomes. Task feedback refers to regular and accurate feedback on how the group is performing tasks. Feedback increases motivation, since employees have actual knowledge of the results of their work (Hackman & Oldham, 1976).

The five core job characteristics provided by Hackman and Oldham (1976), with the possible exception of skill variety, seem important for knowledge-based work systems. Skill variety may not be applicable, because knowledge work is often performed by highly educated specialists (Mohrman et al., 1995) and in some situations, multi-skilling can too expensive to implement (Klein, 1994). Nonetheless, organizational systems which may support the development of motivating jobs include: (1) mechanisms that design jobs so that employees perform a whole and identifiable task and that allows group members to view work outcomes (task identity); (2) mechanisms that design work tasks so they are viewed positively by others inside and outside the organization (task significance); (3) mechanisms which provide group member discretion and independence
when determining work processes and scheduling work (task autonomy); and (4) mechanisms which provide groups with regular and accurate feedback on task performance (task feedback).

Group Characteristics

Another component of Cohen's (1994) model, group characteristics, is composed of three broad areas: (1) group composition; (2) group beliefs; and (3) group process. Group composition is further broken down into technical skills, interpersonal skills, size, and stability. Technical skills are important since the more advanced the technical skills of members in the group, the better the performance of the team. Interpersonal skills affect employee satisfaction with the team, because team members will be more effective working together. Team size affects team effectiveness, since smaller teams facilitate coordination between members, whereas large teams might decrease group member commitment.

Further, Cohen’s (1994) group characteristics component includes group beliefs, which is further broken down into two areas -- well crystallized norms and group self-efficacy. Norms allow the team to have expectations about acceptable behavior and allow the group to regulate and direct team member behavior (Cohen, 1994). Self-efficacy is hypothesized to be positively related to performance, so that high performance leads to high self-efficacy and vice versa (Shea & Guzzo, 1987).

Finally, for the process component of her model, Cohen (1994) adapts part of Hackman’s (1987) normative model of group effectiveness. Hackman proposed that group process criteria of effectiveness has three components: group member effort in
collectively performing tasks, the extent to which group members have the knowledge and skills for task performance, and the degree to which the group uses appropriate task performance strategies. Cohen adapted these three components—coordination and caring, sharing of expertise, and implementation of innovations—to explain the group process element of her model. Coordination and caring refers to team members who work together without duplication or wasted effort and with energy and team "spirit". Sharing of expertise is meant to describe how team members listen to each other and offer their knowledge and expertise. Finally, implementation of innovation refers to a team's ability to invent and implement modifications to their tasks which increase task performance.

**Encouraging Supervisory Behaviors**

Another component of Cohen's (1994) consists of encouraging supervisory behaviors. This component is based on Manz and Sim's (1987) work and is broken into six components: (1) self-observation and self-evaluation; (2) self-goal-setting; (3) self-reinforcement; (4) self-criticism; (5) self-expectation; and (6) rehearsal. Self-observation and self-evaluation refer to management behaviors that encourage teams to gather information for monitoring and evaluating their performance. Self-goal setting extends to management practices that encourage teams to set their own performance goals. Self-reinforcement refers to management behaviors that encourage team members to recognize and reinforce good team performance. Self-criticism refers to management practices that encourage team members to be self-critical and determine antecedents poor performance. Self-expectation is the extent to which management encourages high
expectations for good performance. Finally, rehearsal refers to management practices that encourages the team to think through and practice activities before implementation.

**Organizational Context**

The last category of Cohen's (1994) model, an organizational context that supports employee involvement, is based upon Lawler's (1992) work. Lawler argued that employee involvement is a function of information, knowledge, power, and rewards. Lawler presents these variables in equation form—Involvement = f(Information, Knowledge, Power, Rewards). Information refers to information about work processes, product or service quality, customer feedback, important organizational events, and business results (information systems are discussed further below). Knowledge includes knowledge about how the work is performed, knowledge about the business, and knowledge about the complete work systems. Power refers to the ability of employees to act and make decisions about all aspects of work processes. Rewards refers to systems that reward employees according to business results and employee growth in their capabilities and their contribution to the organization. Lawler argued that any of these elements are missing than the organization receives little or no value in regard to employee involvement.

In addition, Lawler (1992) argued that training programs are an important component in organizations. Training helps employees understand the organizational context of work processes; helps employees to understand business economics; increases employees technical skills that meet organizational needs and that allow them to meaningfully participate in decisions; and helps employees understand that organizations
are serious about their employees' development. Cohen (1994) argued that resources refers to material resources (e.g., raw materials, equipment, tools and space) needed by team to perform their work effectively.

Performance

Cohen (1994) defines uses three components to define performance: team performance, member attitudes with quality of work life, and withdrawal behaviors. The team performance component includes productivity increases, quality increases, and the ability of the team to control costs. Member attitudes with quality of work life includes team member satisfaction with the job, team, social relationships, and growth opportunities, trust in management, and organizational commitment. Finally, withdrawal behaviors include absenteeism and turnover.

Summary

Cohen (1994) did not empirically test her model of work team effectiveness. Further, Cohen does not specify whether her model is applicable to all teams or both knowledge- and production-based teams. Cohen, however, offered several variables that should be assessed when determining an organizations systems supporting collaborative knowledge-based work environments, and offered some hypotheses concerning the relationship between the components of her model and work team effectiveness. For example, Cohen predicts that organizational context variables will be the best predictor of team performance and employee quality of work life; group task design and group characteristics will be associated to quality of work life variables that relate to groups and their task (e.g., job satisfaction, team satisfaction, satisfaction with social relationships.
and growth opportunities; and quality of work life will be negatively associated with group member absenteeism. These hypotheses might be explored in determining which support systems are most important to parameters of work team effectiveness.

Sundstrom, De Meuse, and Futrell's (1990) Framework for Analyzing Work Team Effectiveness

Sundstrom et al. (1990) offered a model of work team effectiveness based on four broad areas: (1) organizational context; (2) boundaries; (3) team development; and (4) team effectiveness. Sundstrom et al., founded their model on an ecological perspective, that "work teams can best be understood in relation to external surroundings and internal processes" (p. 121). The ecological basis of the model helps identify aspects of team functioning and the environment of the team. The following discusses the components of their model—organizational context, boundaries, team development, and team effectiveness—in more detail. Additional research relevant to components of the model are also included. Their model is presented in Figure 11.

**Context**

Sundstrom et al. (1990) differentiate organizational context variables into eight levels: (1) organizational culture; (2) task design/technology; (3) mission clarity; (4) autonomy; (5) performance feedback; (6) rewards and recognition; (7) training and consultation; and (8) physical environment. These levels are discussed in detail and systems are identified which may support team-based organizations and employee collaboration.
Organizational culture. Culture can be defined as the roles, norms and values of a social system (Katz & Kahn, 1966). For instance, roles are specific forms of behavior that develop from performing tasks; norms are expectations for individuals that fill roles; and values "...are the more generalized ideological justifications and aspirations" (Katz & Kahn, 1966; p. 37). Schein (1990) defined culture as:

...what a group learns over a period of time as that group solves its problems of survival in an external environment and its problems of internal integration. Such learning is simultaneously a behavioral, cognitive, and an emotional process. Extrapolating further from a[n]...anthropological view, the deepest level of culture will be the
cognitive in that the perceptions, language, and thought processes that a
group comes to share will be the ultimate causal determinant of
feelings, attitudes, espoused values, and overt behavior. **Culture** can
now be defined as (a) a pattern of basic assumptions, (b) invented,
discovered, or developed by a given group, (c) as it learns to cope with
its problems of external adaptation and internal integration, (d) that has
worked well enough to be considered valid and, therefore (e) is to be
taught to new members as the correct way to perceive, think, and feel in
relation to those problems. (p. 111)

In this paper, the importance of organizational culture is viewed in terms of social norms,
values, or expectations that increase employee collaboration. For example, organizational
values can emphasize innovation over tradition (Cummings, 1981) and emphasize
organizational context variables such as those identified by May and Schwoerer (1994)
(e.g., positive interpretations of stressful events, support, and the free exchange of ideas).

**Culture versus climate.** Some authors distinguish between organizational
culture and climate. For instance, Denison (1996) argued that culture is usually studied
using qualitative methods (e.g., interviews); the focus is generally on the evolution of
social systems over time; and cultural researchers are interested in the deeply help
underlying assumptions of culture, the individual meaning applied to the culture, and an
insider’s view of the organization. On the other hand, climate is studied using
quantitative measures (e.g., surveys); the focus is generally on how organizations
systems impact groups and individuals; and climate researchers are generally concerned
with observable practices and the categorization of these practices into dimensions. Using these criteria, this paper is concerned with organizational climate variables (e.g., norms), particularly as they affect employee collaboration. For example, reward and performance management systems can be developed to encourage values, norms, and assumptions that employees will collaborate at work.

**Task design.** Effective task design can be facilitated by identifying the technology and social components that turn inputs into outputs (e.g., Cummings & Srivastva, 1977; Pasmore, 1988). Hackman and Oldham's (1980) five core job characteristics—task variety, task identity, task significance, task autonomy, and task feedback—can be used to develop motivating jobs. Pasmore (1988) argued that task design is more stimulating when tasks require high levels of interaction among employees, are amenable to modification, provide immediate and direct feedback, and require high levels of skills among employees. Work tasks often require the social component to adapt to technologies (Kelly, 1978) and organizations often expect workers to adapt to existing technologies, which can restrict design choices (Cummings, 1981).

**Mission clarity.** Another organizational context variable in Sundstrom et al.'s (1990) model is mission clarity. Organizations can provide direction for teams by giving them broad knowledge of organizational goals, strategies for meeting goals, criteria and priorities for implementing strategies, and translation of organizational goals into team goals (Mohrman et al., 1995). Mission clarity is discussed later in this paper in terms of goals, performance management systems, and planning.
Autonomy. The autonomy component of Sundstrom et al.'s model is referred to in terms of the managers role to a team, since teams can be structured with different levels of autonomy between team members and management (Ray & Bronstein, 1995), and teams can develop additional autonomy by leadership behaviors which initiate, encourage, and support the self-leadership capabilities of a team (Manz & Sims, 1993). Team design seems important for team autonomy, since appropriate team design can provide teams the resources needed to perform many self-management functions (Mohrman et al., 1995).

Performance feedback. Performance feedback can enhance team performance if given at the team level (Orsburn et al., 1990). Some authors, however, argued that performance needs to be addressed at different levels, including the individual level (Mohrman et al., 1995). Performance feedback is more effective if it is descriptive rather than judging, specific, timed correctly, takes into accounts individual needs, complemented by alternative behaviors, clearly understood, and is checked to ensure its accuracy (Harrington-Mackin, 1994). Feedback should be used as a planning mechanism, not a report card (Shonk, 1992) and the measurement systems should be dependable (Sundstrom et al., 1990). Teams with repeating work cycles may have more dependable measurement systems compared to teams with longer work cycles, project, or development teams (Sundstrom et al., 1990).

Harrington-Mackin (1994) proposed several components of an effective review system, including: (1) trust and respect between the team and management; (2) agreement about the timing, procedures, and goals of the performance review; (3)
well-defined objectives for teams and individual; (4) performance measurement systems that are agreed upon by all parties; (5) feedback systems which provide individuals many opportunities for informal reviews, coaching, and assessment; (6) open and dynamic information exchanges; (7) performance recognition methods that are considerate and appropriate; and (8) respect between team members and peers. Additional components of performance systems are discussed in more detail later in this paper.

Von Glinow and Sethia (1983) offered suggestions on institutional measures which may make acceptance of feedback more effective for knowledge workers. For instance, Von Glinow and Sethia suggest that organizations use knowledgeable and trustworthy individuals to evaluate and provide feedback; encourage collaboration between performers and evaluators; provide rewards in conjunction with evaluators; provide evaluators information about the evaluated work and the interests and goals of the performer; provide evaluators with information on the expertise of the performer; ask evaluators to make comments relevant to the work; give evaluators previous evaluations of the performer; provide evaluations at critical stages of work; ask evaluators to provide information of deviation from goals and steps needed to return to goals; instruct evaluators to describe strengths and weaknesses of the performer's work; ask evaluators to provide encouragement; reward performers for dedication and additional effort.

**Reward and recognition.** Another organizational context variable in Sundstrom et al.'s (1990) model, reward and recognition systems, includes public recognition, individual rewards, desirable work assignments, and money. Reward and recognition
systems enhance team performance by increasing the team's outcome interdependence. Reward systems should be designed to provide challenging objectives and to reinforce the achievements of the team (Hackman, 1987).

Further, reward systems should be congruent with the organization's management style; should be consistent with the evaluation systems; should not be based on the time spent on teams; and should be designed to make the team accountable to the organization as a whole (Harrington-Mackin, 1994).

Effective reward systems have agreement among key people about important goals and desirable or undesirable activities; have available and attractive rewards; have important, performance-related rewards; have distribution systems which provide rewards in a timely manner after the performance; have clearly understood performance appraisal systems; have systems which truly reward desired activities and truly discourage undesired activities; have systems that provide important rewards to the right managers for distribution; have systems which distribute rewards based on actual employee performance differences; and have integrated goal-setting, appraisal, feedback and reward systems (Von Glinow, 1988).

Rewards should be aligned with data-based management systems; should be predictable; should involve lots of information and feedback; should offer employees chances for horizontal development; should be given as soon after the performance as possible; should be perceived as fair; should be aligned with corporate policy; should be aligned with training, encouragement, and follow-up; and should also focus on the "small" wins as well as the big successes (Clemmer & Sheehy, 1992).
Training and consultation. The training and consultation component of Sundstrom et al.'s model refers to the development of skills that facilitate performance on team tasks and interpersonal process skills. Management skills can include teaching teams to lead themselves (Manz & Sims, 1993). Teams, under the right circumstances, can learn multiple job skills (Klein, 1994). Teams need the right kind of training, however, depending on the task requirements and the needs of the team (Hackman, 1987). Effective training experiences: (1) provide opportunities to share experiences; (2) provides some control and self-direction; (3) relates prior experience with the development of new skills; (4) supports participation and provides opportunities to perform tasks; (5) engages participants with a friendly atmosphere; (6) allows opportunities for practical application of the training; (7) repeats information in different ways; (8) provides feedback frequently, accurately, and specifically; and (9) provides individuals with the opportunities to ask questions (Harrington-Mackin, 1994).

Further, organizations can offer career development support for knowledge workers. Von Glinow (1988) offered several suggestions concerning career support, including: provide career information systems about new positions; offer computerized skill inventories that list employee skills; provide career counseling services; develop a career sequencing and monitoring system so that career movements are logical instead of random; and offer career development workshops. Providing career growth opportunities may develop loyalty among knowledge workers and helps support the technological needs of organizations.
Physical environment. The last context component, physical environment, can enhance team performance by co-locating team members, providing opportunities for face to face communication, and creating team norms signified by the physical space of the team (McDermott, 1995). External coordination needs may be facilitated by reception and conference rooms (Sundstrom et al., 1990). Groups performing easily disrupted work processes may benefit from enclosed working areas (Sundstrom et al., 1990).

Boundaries

Another major component of the Sundstrom et al. (1990) model includes the boundaries of the team. Further, two key aspects of boundaries that may affect team performance include differentiation and integration (Lawrence & Lorsch, 1967). Lawrence and Lorsch claimed that differentiation and integration occur as organizations segment their internal functions to address external environmental needs; each organizational segment has its own major task relating to the external environment it interacts with. Differentiation occurs in organizations by the development of organizing processes that facilitate effective performance of a subtask in an organizational segment. For each task, different structures, processes, cognitive, and emotional orientations will develop, since the structures for each task are different. For example, managers may develop different cognitive, emotional orientations, and "languages", because their subtasks have processes which have different levels of uncertainty and different time frames. Further, integration refers to successful completion of the task by coordinating the differentiated task processes. The higher the degree of differentiation between task processes, the more difficult integration will become.
External integration needs. Additionally, Sundstrom and Altman (1989) argued that team integration needs are determined by the frequency of external interactions required by the group; the degree to which procedures and products are standardized; the pace of work (e.g., short or long work cycles); and the degree to which the team must synchronize work with other work units. For instance, a team responsible for shipping materials to customers inside the organization will have high external integration needs. Further, teams with short work cycles (e.g., a production-based team) may require close external synchronization, and teams with longer work cycles may have lower external integration needs. Thus, the external integration needs and effectiveness of a team may depend upon the demands placed upon the boundary of the team (Sundstrom et al., 1990).

External differentiation needs. Further, Sundstrom et al. (199) identified three factors which affect external differentiation, including group membership, temporal scope, and team territories. Group memberships variables include composition of the team, turnover of group members, and size of the team. For example, the composition of teams may be enhanced by allowing teams to choose their own members; turnover may be a significant factor in groups composed of skilled specialists; and the development of team territories can be an effective method for developing team boundaries (e.g., McDermott, 1995). Temporal scope can affect team performance and how teams are structured. For instance, teams with short time spans, such as advisory boards, may benefit from a heterogeneous team composition (Sundstrom et al., 1990) and may not be managed through the organization’s business and performance management processes (Mohrman et al., 1995). In contrast, teams with long life spans may depend upon the
compatibility of team members (Sundstrom et al., 1990). Finally, team size should be as small as possible to maintain quality outputs and maintain efficiency (Hackman, 1987).

**Team Development**

Another component in the Sundstrom, et al., (1990) model are team development processes, including norms, cohesion, roles, and interpersonal processes (e.g., communication, decision-making, and conflict resolution). Norms have been covered in Hackman’s (1987) model. Roles, particularly managerial and integration roles, will be covered in Mohrman et al.’s (1995) work. Interpersonal processes and methods that reduce (i.e., politics) and develop group cohesion (i.e., consensus) are briefly discussed in the following section.

**Politics and interpersonal processes.** Pfeffer (1981) defines politics as “...those activities taken within organizations to acquire, develop, and use power and other resources to obtain one’s preferred outcomes in a situation in which there is uncertainty or dissensus about choices.” (p. 7). Politics and power struggles can decrease group satisfaction (Wilson, 1995). However, several ways that groups may avoid dissatisfaction due to politics is to develop a team code of conduct, develop team member conflict resolution skills, use decision-making procedures, have a facilitator on the team, and develop decisions by consensus. These are discussed below.

**Code of conduct.** A team code of conduct (i.e. rules of expected behaviors): (1) helps develop common expectations; (2) encourages desirable behavior among team members; (3) increases the self-management abilities of teams; (4) provides team members a written record of desirable behaviors; (5) facilitators orientation of new
members; and (6) facilitates the development of new behaviors when problems occur (Harrington-Mackin, 1994). Ground rules for effective groups include: team members are expected to test their assumptions and inferences during group meetings; team members should share information relevant to the topic under discussion; team members are expected to focus on the topic of discussion; and team members should not distract the group by taking “cheap shots” (Schwartz, 1994). Teams should develop codes of conduct early during the life of the team to develop positive relationships, to mature properly, and to avoid unnecessary problems (Harrington-Mackin, 1994).

Knowledge, skills, and abilities. Further, Stevens and Campion (1994) offered several aspects of interpersonal knowledge, skills, and abilities—conflict resolution, collaborative problem-solving, and communication knowledge, skills, and abilities—that address many interpersonal processes necessary for effective team work. For instance, effective conflict resolution requires the knowledge, skill, and ability to: identify and support desirable conflict and discourage undesirable conflict; recognize the variety and origin of conflict and implement a resolution strategy; and employ win-win negotiation strategies. Collaborative problem-solving requires the knowledge, skills, and abilities to identify the degree, type, and when a collaborative problem-solving strategy is required; and recognize barriers to collaborative problem-solving and develop corrective actions. Finally, communication requires the knowledge, skill, and abilities to: understand communication “networks” and use informal networks when necessary; communicate supportively and openly; listen; maintain congruence between verbal and nonverbal messages and recognize and evaluate the nonverbal messages of others; and recognize
the importance and engage in "small talk" and greetings. The knowledge, skills, and abilities identified by Stevens and Campion and organizational systems to provide individuals with these skills, might reduce political battles and power struggles on teams.

**Decision-making.** Effective decision-making procedures may also reduce political behaviors and increase positive experiences on teams. Criteria for effective decision-making procedures include: (1) a clear definition of the problem; (2) agreement concerning which individuals are responsible for making the decision; (3) agreement about procedures or methods (e.g., brainstorming followed by evaluation of alternatives) before discussion of the problem; (4) effective communication between team members that facilitates idea generation; (5) a team size that is appropriate for making a decision; (6) methods for deciding on the best alternative for solving the problem; (7) procedures that build commitment and ownership for the decision; and (8) a commitment to implementing the decision by the organization (Harrington-Mackin, 1994). In addition to systems that provide teams information on goal achievement, cost, waste, quality, project status, schedules, and new orders, computers can be used to facilitate decision-making on tasks (Fisher, 1993). For instance, Apple Computers developed software that helps make staffing decisions (Fisher, 1993).

**Facilitation.** Additional, Schwarz (1994) argued that facilitation skills help group effectiveness by helping group members reflect on their functioning and then creating conditions which help achieve group goals. "Group facilitation is a process in which a person who is acceptable to all members of the group, substantively neutral, and has no decision-making authority intervenes to help a group improve the way it identifies
and solves problems and makes decisions, in order to increase the group’s effectiveness (p. 4). Facilitators help groups solve problems and make decisions by improving how groups work together.

**Consensus.** Consensus occurs when the entire team agrees and all members commit themselves, to a decision or solution (Harrington-Mackin, 1994). Further, guidelines for consensus making include: (1) a topic is identified; (2) team members discuss the topic, ask questions or discuss concerns, present and evaluate data, and discuss solutions; (3) team members decide if consensus should be reached, the time needed to reach consensus, and the consequences of not reaching consensus; (4) team members discuss differences or similarities about the topic; (5) team members make suggestions or modifications to the topic; (6) team members create a new idea based on previous discussions; (7) the facilitator uses nonverbal cues to determine if consensus has been reached; (8) the facilitator asks for new ideas if consensus has not been reached and from this discussion, checks for consensus again; (9) the facilitator asks for other possibilities or a trial period for the proposal if consensus has not been reached; and (10) the facilitator checks for consensus on the modified proposal or after the time period has passed. (Harrington-Mackin, 1994). Further, team members that block decisions should have participated in earlier discussion, must be able to explain the reasons for blocking the decision, should be willing to compromise, and must be allowed to disagree with the team (Harrington-Mackin, 1994). Consensus decision-making helps group effectiveness by increasing the internal commitment of the group to decisions (Schwarz, 1994).
Conclusion

Sundstrom et al. (1990) offered an ecological model of work team effectiveness based on four broad areas—organizational context, boundaries, team development, and team effectiveness. Organizational context was broken into culture, task design, mission clarity, autonomy, performance feedback, rewards and recognition, training and consultation, and physical environment; boundaries were divided into differentiation and integration; and team development was divided into interpersonal processes, norms, cohesion, and roles. Sundstrom et al. offered a useful model for identifying systems that support team-based collaboration.

Mohrman, Cohen, and Mohrman's (1995) Model of Team-Based Organizations

Mohrman et al. (1995) offered an information-processing model of team-based organizations. The premise of their model is that organizational structures and linking mechanisms should be developed so that: (1) organizational members with task interdependencies can collectively process information and make decisions; (2) multiple perspectives are considered when complex trade-offs or deliberations are made on issues; and (3) processes that provide value to customers are integrated. The following discusses aspects of Mohrman et al.'s framework for designing effective team-based organization systems (presented in Figure 12) in terms of identifying team issues and organizational support systems.

Elements of Mohrman et al.'s (1995) framework includes: (1) organizational strategy; (2) the nature of the task; (3) key design features, such as team attributes, multiteam linkages, management structure and roles, integration processes, and
performance management processes; (4) facilitators, including integration, timely
decision-making, and efficacy; and (5) effectiveness—performance at the team and
business unit level, improvements and learning, and satisfaction. The following discusses
the elements of their framework in detail.

**Organizational Strategy**

Mohrman et al. (1995) argued that the strategic goals of the organization must be
clear to organizational members. Elements that make up an organizational strategy
include an organizational mission and the identification and application of resources to
reach the organizational mission. A clear organizational strategy might include what the
organization is attempting to accomplish, the identification of necessary tasks to meet the
organizations strategy, and a team design that facilitates achievement of business-unit and
organizational goals. Further, mechanisms must be developed so that the organizational strategy is shared and organizational members are alerted if goals and strategies change. Sharing organizational strategy allows teams and business-units to structure their goals in order to reach organizational goals.

**Purpose of Strategy**

Mohrman et al. (1995) proposed that a major purpose of strategy is to set direction for the organization. Direction setting mechanisms help produce goal alignment between organizational, team, and individual goals. For instance, strategy (direction) helps determine organizational trade-offs, business-unit strategies, and team strategies and can help establish shared methods of operating across different aspects of the organization. Direction in team-based organizations is based on: (1) a broadly held knowledge of where the organization is going; (2) a broadly available strategy for getting there; (3) criteria and priorities of the organizational-wide strategy; and (4) the translation of broad direction into more specific, local goals. By defining a strategy, communicating the strategy to organizational members, and operationalizing the strategy at all systematic levels, organizational members better understand how their goals are shared between other teams and business units.

**Vertical and Horizontal Goal Alignment**

However, Mohrman et al. (1995) stated that to help business-units and teams reach organizational goals, mechanisms must be in place for setting goals and business strategies—an organizational plan for applying resources to meet goals—vertically and horizontally within the organization. Mohrman et al.'s research found that a clearly
defined, well-understood business strategy, goal alignment at multiple system levels, and measurable goals, were positively related to employee's beliefs that they could meet organizational goals. Further, Mohrman et al. argued that goals must fit within systematic levels (lower level fits higher level) and between units at the same level (unit level fits similar unit level). For example, vertical alignment occurs when overall organizational strategy is translated into goals at the business-unit level and team goals are nested under business-unit goals. Horizontal alignment occurs when business-unit goals are aligned with other business-unit goals in order to meet organizational goals, and team goals are aligned with other team goals within a business-unit or between teams in other business-units, to meet business-unit goals and organizational goals.

To align goals laterally and to make goals compatible, Mohrman et al. (1995) proposed that teams should set goals collaboratively. Additionally, goal alignment must be negotiated between parties given the current organizational resources and requirements. For instance, one example of collaborative goal setting are "stretch" goals--goals that require unusually high performance levels. Mohrman et al. found that effective teams had goals organizational members agreed upon and which required high levels of performance.

However, to be effective, Mohrman et al. (1995) argued that teams must be empowered to set goals meeting the overall strategy of the organization and their business unit; their research suggests that an important source of performance leverage is team member participation in goal setting, since participation increased team member confidence in reaching goals. Ineffective teams had managers who kept plans to
themselves and who served as an integrating mechanism between individual team members. Additional performance advantages can be created by having organizational members develop their own performance strategies.

Further, Mohrman et al. (1995) proposed that mechanisms for setting goals horizontally and vertically include cross-functional management teams. For example, cross-functional management teams can link teams to broad organizational strategies by developing business unit strategies and collaborating on the development of team strategies and the allocation of resources. Resource allocation can be determined by the needs of teams and organizational strategies. In addition, cross-functional management teams must create a shared understanding, including: (1) what goals the organization is trying to accomplish; (2) how the organization will accomplish its goals; (3) how people with different knowledge bases will integrate perspectives; and (4) how business-unit goals and activities are aligned with organizational strategy. A shared understanding is important, because the effectiveness of management teams is related to their ability to develop an internally shared understanding of the organizational and business-unit's goals and priorities and how to reach these goals and priorities. Thus, it is management's responsibility to makes sure that organizational, business-unit, and team level strategies are articulated, broadly shared, understood, and reflect information from organizational performers and the environment. Managerial roles can also be created, when necessary, to link teams with the broader organizational strategy.
Nature of the Task

Another element in Mohrman et al.'s (1995) framework for team-based organizations is the nature of the task. Strategies affect tasks, since strategic choices (discussed in the previous section) are related to the tasks and individuals chosen to perform tasks—strategic choices determine what tasks are necessary to meet organizational objectives, the design of organizational structures necessary for meeting task demands, and the developmental needs of individuals who perform tasks. Thus, the development of tasks and people proceed in tandem. For example, by developing strategies, tasks are determined that address what work needs to be done and what skills and capabilities are needed to accomplish task and strategic demands. Further, task demands and the skills and abilities of organizational members, aid in the appropriate design of teams, since the team can be composed of individuals with the skills needed to perform team tasks. The appropriate design of teams is important to meeting task demands and adding value to the organization.

Team and Task Design

For example, Mohrman et al. (1995) argued that the task must be appropriate for team design, since successful teams depend largely upon environmental and strategic contexts that make tasks appropriate for teams. Often, organizations establish teams and expect teamwork to occur without the proper organizational patterns and systems which complement one another and which reinforce intended behavioral patterns. Additionally, the needs of important stakeholders must be taken into account when determining task
requirements, and the skills and abilities of organizational members must be considered when organizing teams so that the necessary skills are available to accomplish tasks.

Mohrman et al. (1995) proposed that a major component in determining if tasks are appropriate for teams is the degree to which task interdependencies affect task performance. For example, task interdependencies determine the extent to which individual contributors and the team are interdependent. Interdependencies affect performance, since it is difficult to hold teams accountable for interdependencies that lay outside its boundaries--interdependencies outside the team reflect the performance of the larger system (i.e., individuals, teams, etc., that constitute a larger system). Further, whereas simple interdependencies may be routinized through the use of specifications or procedures, more complex and reciprocal interdependencies may require formal or informal integration and conflict resolution mechanisms. Thus, organizational designers must determine where task interdependencies interrelate so that group tasks fit together.

Task Complexity and Leadership Roles

Another aspect of task performance affecting team design is task complexity, since key players should be included in teams to handle interdependencies between functions or areas (Mohrman et al., 1995). Thus, complexity of information-processing demands can affect how teams are structured (Galbraith, 1973). Galbraith (1973) argued that information uncertainty can overload the ability of teams to make decisions and requires the introduction of leadership roles to handle integration needs. Leadership roles can require task management and boundary skills to successfully perform integration needs (Mohrman et al., 1995).
Further, Mohrman et al. (1995) proposed that by identifying task interdependencies, task information-processing demands, and the needed skills and abilities of organizational members, teams can perform many of their internal and external management and performance management functions. Internal task management functions may include: (1) planning; (2) goal setting; (3) performance review; (4) the application of resources; (5) the determination of strategies to meet task demands; (6) coordination of integration needs within the team and with external stakeholders; and (7) the responsibility for monitoring output quality and modifying processes to increase quality. External management functions can include boundary management functions, including the coordination of inputs and output with stakeholders within and external to the organization, the development of mutually beneficially processes with stakeholders, and mechanisms for interfaces between stakeholders and the redesign of these processes and mechanisms to improve their effectiveness. Well-designed teams also are involved in performance management practices that include the team as a whole and individuals within the team. Performance management practices can include determining objectives, reviewing the performance of the teams and individuals, determining methods to improve performance, and allocating and determining rewards.

Key Design Features

Mohrman et al.'s (1995) framework for designing effective team-based knowledge systems also consisted of key design features. Key design features include team attributes, multiteam linkages, management structure and roles, integration processes, and performance management processes. These features are discussed below.
Team Attributes

Mohrman et al. (1995) offered many different aspects of team functioning. The following highlights some of the major points in their work, including research on team effectiveness, a description of a prototypical work team (i.e., production-based team), cross-training in knowledge work teams, conflict resolution skills, task performance skills, learning and leadership skills, effective internal team processes, and empowerment.

Research on team effectiveness. Mohrman et al. (1995) reported research evidence suggesting that effective teams performed many of their own management functions, including the planning and execution of work--how work is done, who does the work, formal and informal integration processes, and performance monitoring and evaluation. Further, effectiveness was positively related to internal task management practices (e.g., goal setting; task performance strategies, and coordination and integration needs), a minimum amount of time in meetings, and the manager role in reviewing team performance--managers can help teams determine and perform tasks addressing business-unit needs and can assist the team in improving internal processes. Team effectiveness was also found to be negatively related to the amount of external integration required to performing tasks. Mohrman et al. argued that when integration roles are necessary, these should be performed by individuals with the appropriate skills and abilities, and team members need to accept the authority of their peers when performing integration functions.

Prototypical work team. Further, Mohrman et al. (1995) offered a description of a prototypical work team with effective design features. First, the team is
self-contained—team members are responsible for an identifiable and substantial piece of work and team members depend minimally on individuals outside its boundaries to perform tasks. For example, the team: (1) contains the resources needed to accomplish goals; (2) are cross-trained (discussed further in the next paragraph); (3) are dedicated to work within the boundaries of the group; and (4) report as a group to managers and other units within the organization. Second, the team manages many aspects of its functioning, including task management, boundary management, and performance management. Task management and boundary management have been discussed above (see the section Nature of the Task); performance management is discussed below (see the section on Performance Management).

Cross-training in knowledge work teams. However, Mohrman et al. (1995) argued that cross-training in knowledge-based work settings is problematic, since knowledge may be too expensive for all team members to attain. Nonetheless, to understand and discuss issues and make important trade-offs, team members need a minimal understanding of their team member's disciplines. Further, team members need interpersonal and conflict resolution skills, including the ability to clearly communicate, listen, freely express ideas and feelings, and the ability to resolve conflict.

Conflict resolution skills. Mohrman et al. (1995) argued that conflict resolution may be at the center of what is needed to work collaboratively in lateral organizations. Effective conflict resolution requires that team members be able to: (1) transcend differences between individuals; (2) develop shared understanding with other team members; (3) work toward solutions that mutually benefit team members; (4) express
feelings and frustrations openly; (5) listen to other team member's feelings and concerns; and (6) develop systematic decision-making tools that identify important information and effectively evaluate and analyze solutions. A systematic decision-making process might include mechanisms to collect data, evaluate alternatives, and determine the outcomes of a decision. Decision-making skills are most effective when new team members receive proper orientation to the needs and demands of the team, when there is good on-the-job training, and when there are appropriate facilitation skills on the team.

**Task performance skills.** Further, Mohrman et al. (1995) proposed that teams must be composed of individuals possessing the skills needed to effectively perform task functions. Broadly, these skills include technical or functional competence (i.e., the technical or functional competence of team members must be collectively sufficient to meet task demands), cross-training, interpersonal and conflict resolution skills, and decision-making skills. For example, technical competence can be obtained and increased through educational opportunities and through opportunities to gain "hands-on" experience. Team members need to maintain technical knowledge in their fields and must gain practical experience through lateral interactions and feedback from other departments or work areas. In addition, teams need methods for inducting new team members. In this case, resources must be available to develop new team members by formal or informal relationships and through external functional resources.

**Learning and leadership skills.** Mohrman et al. (1995) also argued that team members need to possess learning skills and leadership skills. Important learning skills include the ability to acquire new knowledge about their respective skills, the ability to
understand the general framework and language of other team members, and the ability to develop interpersonal and conflict resolution skills. Learning skills and personal development are enhanced when team members reflect on how they work together, receive feedback from multiple perspectives and develop action plans from feedback, and when an expert facilitator is available to develop skills and to coach individuals. Leadership skills include the ability of team members to informally influence other individual, to communicate effectively, to develop skills which allow team members to effectively express their feelings and give opinions about tasks, and to reach consensus on final decisions.

Internal team processes. Additionally, Mohrman et al. (1995) proposed that teams need internal team processes which develop shared understanding between team members. Examples of internal team processes include the ability to adopt a team perspective when determining tasks and goals, skills in analyzing data and evaluating options, mechanisms for developing concrete plans and actions, the ability to clarify decision-making responsibilities, and the ability to constructively resolve conflict.

Empowerment. Finally, Mohrman et al. (1995) proposed that teams should have the empowerment to make a difference in attaining individual, team, and organizational goals. This includes the ability to attain goals that meet the organization and business-unit needs and the knowledge, skills, information resources, and power to make a difference in reaching objectives. Further, teams should be able to escalate issues to a broader forum when making decisions on trade-offs, and teams should have technical expertise and knowledge of customer needs when organizations set direction (e.g.,
strategies and goals) and determine the allocation of resources. Teams also need access to information that helps clarify their role in the organization (e.g., priorities and goals).

**Multiteam Linkages**

Another component in Mohrman, Cohen, and Morhman’s (1995) framework for effective team-based organization, multiteam linkages, refers to mechanisms that assist in the coordination of interdependencies between teams. Similar to the design of teams, team linkages depend upon task demands and can enhance organizational performance and effectiveness. However, to reduce unneeded duplication in this paper, multiteam linkages are developed in more detail under management structures and roles and under integration processes.

**Management Structure and Roles**

Mohrman et al. (1995) discussed several aspects of management performance, including executive management responsibilities, management team effectiveness issues, management team skills and abilities, the “new” manager, the clarification of management structures and roles, and team self-management and information processing needs. These aspects of management are briefly discussed below.

**Executive management team responsibilities.** For example, Mohrman et al. (1995) contended that executive management teams have four major responsibility clusters: (1) modeling team-focused norms; (2) designing the organization’s structures and systems; (3) setting and communicating strategy and goals; and (4) managing and integrating business-unit performance. The following discusses these four responsibility clusters in more detail.
First, Mohrman et al. (1995) proposed that executive managers must model the norms of the organization. For example, modeling behaviors might include the ability to be influenced from multiple directions and from multiple perspectives, learning, good decision-making skills, and a customer orientation. Further, the effectiveness of executive management in addressing cross-functional issues can establish a basis for resolution of cross-functional issues organization wide.

Second, Mohrman et al. (1995) argued that executive managers must design the organization's structures and systems at the macro level of the organization. Designing organizational structures and systems includes determining the nature of financial, information, and human resource systems and ensuring that these systems meet the strategies and goals of the organization. To perform this function effectively in a team-based organization, however, executive managers must understand team-based logic (e.g., the human resource function must develop systems that motivate individuals to work collaboratively).

Third, in setting and communicating corporate strategy and goals, Mohrman et al. (1995) argued that executive managers must ensure that a process for developing a shared understanding of strategy exists, and that goals are aligned among organizational units. Executive managers must also manage strategic direction tasks, including allocating resources between business units, allocating shared resources between business units, ensuring that strategies and priorities are communicated and understood, and making decisions on trade-offs when competing preferences cannot be resolved laterally at lower levels.
The last executive management function described by Mohrman et al. (1995), performance management, refers to the orchestration of business units and business-unit management teams. By cross-functional management of cross-functional business-unit teams, executive managers ensure that business-units optimize performance at all levels instead of focusing on the functional performance of business units. Performance management issues include goal setting and the definition, review, and rewarding of performance (covered in more detail below).

**Management team effectiveness issues.** Further, Mohrman et al. (1995) stated that effectiveness issues influencing management performance include key internal processes and key services and products. Key internal processes include the development of a shared understanding, planning and goal setting, and team management. For example, management teams develop shared understanding by clarifying values, making issues concrete, involving organizational members in decisions, clarifying decision-making responsibility, and facilitating conflict resolution. Management of team performance includes assisting in the development of team goals, reviewing team performance, participating in the reward process for teams, and providing input in team goal setting. Management teams services and products include direction (strategy, goals, and priorities); design issues such as the appropriate design of teams, organizational structures, and processes; information (e.g., priorities and goals); the allocation of resources; the performance management of teams and business-units; and norms (e.g., eagerness to learn, influence and participation from other levels, the use of systematic decision-making processes, and a customer orientation). Mohrman et al.'s research
suggests that compared to ineffective management teams, effective management teams provided direction to the organization. For example, management teams were more effective when they developed a shared understanding of where and how the management team was leading the organization; when they planned and set goals with teams collaboratively; and when they encouraged team self-management skills.

Management team skills and abilities. Mohrman et al. (1995) further argued that management teams must have an appropriate mix of skills and abilities including leadership skills, coaching skills, and skills in organizational design and change. For example, important leadership skills include a commitment to communicating, participating, and working through differences, the ability to set an organizational vision, and the ability to develop processes that share the vision throughout the organization. Coaching skills needed by managers include the ability to: encourage team goal setting consistent with organizational needs; encourage teams to share performance management responsibility; make teams “self-aware” by asking appropriate questions and developing feedback mechanisms; encourage teams to use systematic decision-making processes; encourage teams to adopt an attitude of continuous improvement; and develop technical mentoring skills. Management skills in organizational design and change include skills in team design, team effectiveness, performance management processes, organizational change (e.g., conceptual issues and principles of organizational change), and functional knowledge.

The “new” manager. Additionally, Mohrman et al. proposed that the heart of a manager's job is to manage teams and be a team member—a "new" manager. New
Managers can effectively design performing units, craft large-scale change processes, understand issues that develop a supportive organizational context, and stimulate organizational learning, including the development of norms for functioning in a collaborative work environment.

**Clarifying management structures and roles.** Another important component addressed by Mohrman et al. (1995) in designing team-based organizations is clarification of management structures and roles. Clarity of management roles is important, since management roles must be redefined to reflect lateral relationships instead of hierarchical relationships. Even though hierarchical roles must be established to handle integration needs (Galbraith, 1994), Mohrman et al. argued that the key to developing hierarchical roles is ensuring that they effectively handle business issues while simultaneously moving authority, as much as possible, to teams. Thus, the balance of power between hierarchical roles and teams involves design choices, including the functions management perform, the functions teams perform, the extent that teams are self-managing, the leadership roles assigned to team members, and the extent to which individuals without hierarchical authority can perform leadership roles. Further, this balance of power can be applied to several management tasks, including task management, performance management, boundary management, and technical leadership.

**Self-management and information processing needs.** Techniques for balancing power between hierarchical roles and teams include granting teams as many self-management responsibilities as possible; involving team members in determining leadership roles and other self-management choices; developing lateral mechanisms for
integrating between teams and business units; and creating management roles when necessary to link the team across organizational boundaries (e.g., determining strategies, priorities, or allocation of resources).

However, Mohrman et al. (1995) contended that the balance between hierarchical roles and the self-management capabilities of teams is moderated for knowledge-based work teams, since the specialized expertise of knowledge workers and a limited understanding of organizational priorities and goals, often results in conflict between the needs of knowledge workers and organizational needs. Further, self-management can be moderated by the information-processing needs of teams (see the next paragraph)—high amounts of uncertainty, complexity, and interdependence can make self-management impossible (Galbraith, 1973). Mohrman et al. offered a rule of thumb for knowledge-based teams and self-management: When information-processing needs and task complexity exceed the capacity for informal methods of handling the information, then a leadership role should be created. Other factors influencing task complexity and information-processing demands include the interdependence needs of team members, the size of the team, the functional diversity of team members, the degree to which the team is “self-contained” (e.g., interdependencies lie within the boundaries of the team), the extent to which the team is affected by change, the technical skills and experience of team members, and the life span of a team.

For example, a team with high interdependence demands (e.g., team members must consult with other team members before making decisions) may require a leadership role to integrate and coordinate concerns and issues. The leadership role may track
unresolved issues, facilitate meetings, ensure key players are involved in decisions, and contribute technical information to the team. Team size affects integration problems, since larger teams increase the number of interactions that are possible, the points of view that must be considered, and the planning that must be done to coordinate team members. Coordination needs increase as functional diversity among team members increases, since more points of view have to be considered. In this situation, the team leadership role may be given to an individual with a broad-based background, so that he or she may help "translate" between areas of expertise. The degree of self-containment may also increase coordination needs, because low self-containment makes decision-making more cumbersome, makes inter-team integration more of a necessity, and may require more boundary management roles. Coordination needs can be affected by different types of change, including technical difficulties or successes, strategic changes, resource allocation changes, and competitive "surprises" such as changes in missions or task execution strategies. Thus, a leadership role may be required to "buffer" team members from unpredictable environments. The technical experience and skills of team members may affect the need for leadership roles, because less technically competent or less experienced teams may require more leadership and boundary management. Finally, short-term teams may require coordination and leadership roles unless team members already possess the necessary self-management skills.

Integration Processes

To a large extent, integration processes have been covered in previous sections. For example, Mohrman et al. (1995) argued that the three most important integration
processes include direction-setting, information (e.g., priorities and goals) communication and distribution, and systematic decision-making processes. Further, organizations need shared methods of operating, including aligned goals, a unifying strategy, and common processes. Direction-setting mechanism, information communication and distribution, aligned goals, and strategy have been discussed. The following briefly discusses two aspects of integration, common processes and decision-making, in more detail.

**Common processes and information sharing.** Mohrman et al., (1995) stressed the importance of common knowledge bases as an integrating mechanism. For example, teams might share a database of information on customers, products, quality levels, production levels, cost, knowledge, etc. Common knowledge bases, however, may require similar processes between teams—similar computer systems, databases, etc., that enhance the ability of team members to share information. Further, common knowledge bases and similar methods of operating produce organizational development issues that should be addressed: (1) the individualized needs of teams must be balanced with the information sharing needs between teams; (2) clear mechanisms for resolving trade-offs must be in place when team members cannot resolve issues or teams cannot resolve issues laterally; (3) goals and information must be shared vertically and laterally; (4) norms must be in place for sharing information laterally; (5) the appropriate parties must be included in decision-making; and (6) decision-making processes must be systematic and timely so that team and business-units can determine priorities and enhance effectiveness. Common knowledge bases, computer systems, decision-making procedures, norms, etc., should enhance the ability of organizations to integrate teams.
Decision-making. Another component of integration referred to by Mohrman et al. (1995), decision-making, may be facilitated by three factors: (1) clarity of decision-making authority; (2) the involvement of appropriate parties when making decisions; and (3) systematic decision-making processes. For example, clarity of decision-making authority is reduced when team-based designs coexist with functional-designed organizations; when decision-making power is distributed between teams and managers (e.g., all decisions cannot be made by teams); and when teams are poorly designed. Clarity of decision-making authority is increased when decision-making responsibility is charted (e.g., a matrix is created charting who should be included in decision-making, who has decision-making authority, and who should be informed of decisions) and when decision-making escalation paths are specified. Further, escalation paths are useful for making trade-offs between competing interests, and should include: (1) clear norms for use; (2) the understanding that use of escalation paths does not mean teams have failed; (3) continued ownership of the problem; and (4) a collaborative decision-making structure so that teams learn to make their own trade-offs in the future. Clarity of decision-making authority should also include norms about the time needed to make decisions. Furthermore, problems that may occur when the appropriated parties are not included in decision-making include: (1) poor decisions; (2) a lack of commitment to decisions; (3) delayed decision-making; and (4) reoccurring decisions that are never firmly resolved. Finally, systematic decision-making processes increase the timeliness of decision-making and related the strongest to team and business-unit effectiveness. Systematic decision-making processes should specify how decisions are made, the steps
involved in making decision, data that should be considered, and which parties to include in the decision.

Performance Management Processes

Another component in Mohrman et al.'s (1995) framework for effective team-based organizations includes performance management processes—defining, developing, reviewing, and rewarding performance at the individual, team, and business-unit level. Managing performance at the three levels helps align performance, since each level is proceeding in the same direction as other levels, and performance at each level is aligned with performance at the next highest level. The following discusses defining, developing, reviewing, and rewarding performance in more detail.

**Defining performance.** Mohrman et al. (1995) argued that of the four performance management processes, defining performance was the most related to subsequent performance. To be effective, however, performance had to be defined at all levels, not just the individual level. Further, Mohrman et al. argued that several factors should be included when defining performance: (1) establish the general direction and role of the performer (for business units, direction is established by developing mission and strategy); (2) identify the needs of key stakeholders (e.g., business managers, customers, and co-performers); (3) determine what outputs should result from performance and the tasks needed to produce these outputs; (4) determine goals and objectives for stakeholders and the different levels above the performer, and task performance goals for the performer and different levels; (5) establish applicable metrics; (6) determine how the work will be performed and organized; and (7) determine the
resources, tools, and skills needed by performers to reach their performance objectives.

As these factors suggest, Mohrman et al. found that higher performance resulted when performance and performance measures were defined specifically from the onset.

Further, Mohrman et al. (1995) argued that principles for defining performance should include: (1) a vertical fit to the larger organizational system; (2) a lateral fit that is congruent with vertical fit (e.g., performance is determined in collaboration with co-performers--teams with interdependent teams, co-workers with co-workers, and business-unit with business-unit); (3) performance should not overextend the performer (e.g., an individual involves team members in explaining the individual's total performance commitments); (4) key stakeholders should have a prominent role in defining performance; and (5) the performer should have a role in defining their own performance. These principles help establish performance in the context of lateral and vertical organizational needs.

Mohrman et al. (1995) also offered a model for designing team-level performance. For example: (1) performance is defined (e.g., goals, objectives, metrics, and resources) with the input of key stakeholders (e.g., other teams, customers, and business-management), the most important of which is the team's business-unit; (2) performance is determined in the context of the overall direction of the organization with help from business-unit management; (3) teams determine how to accomplish its performance requirements; and (4) goals and metrics are determined collaboratively with the team and the business-unit. Thus, performance definition for teams is a collaborative effort involving teams, key stakeholders, and managers.
Finally, Mohrman et al. (1995) offered a model for designing performance at the individual-level, including: (1) the individual is involved in the team planning process; (2) an individual's contribution to the team is determined in conjunction with other team members; (3) individual performance roles are integrated into an overall performance definition for the team; (4) all team members are aware of other team member performance commitments; and (5) processes are in place so that performance definition does not become overly burdensome or seen as an unneeded administrative burden. Mohrman et al. argued that defining performance should not be a laborious process, but equal in scale to the performance under definition. Most companies, however, spend inadequate amounts of time defining performance.

Developing performance. Another component in Mohrman et al.'s (1995) performance management model is the development of performance. Developing performance is a crucial component of the model, since development provides the capability to meet the directional needs of the organization. In a team-based setting, however, performance development takes on an additional meaning. Developing team performance can mean the addition of new skills, such as social or team-oriented skills, or involve human resource allocation issues, such as the adding or replacement of team members. Team development can also mean the addition or modification of processes for producing outputs and the acquisition of tools and resources to aid the performance of the team.

Further, Mohrman et al. (1995) contended that important practices needed in the development process include: (1) the organization of work and roles according to
performance plans; (2) the acquisition and allocation of skills, tools, and resources to
performers; (3) the establishment of important relationships between performers and
stakeholders; and (4) the modification of situational and context variables so that
performance is facilitated (e.g., the systems or processes teams use to meet or which
supports performance). These practices highlight the importance of the context
surrounding the team, which may be more important to team performance than the team’s
internal competencies. The team must be able to develop its context, including the
development of appropriate relationships (e.g., with managers, customers, and
co-performers) and develop supportive organizational systems and processes.

Mohrman et al. (1995) also indicated that the development of performance
includes internal and external development needs that must be balanced. Internal
development includes the organization and acquisition of resources to meet performance
within the internal boundaries of the team. For example, teams might ask for an expert
facilitator to work through interpersonal issues or ask for training on good
decision-making skills. External development means changing the organizational
context, including organizational systems and processes that facilitate performance,
appropriate relationships between co-performers, customers, and managers, and new
systems and processes. Mohrman et al. found evidence to suggest that failure to spend
time on allocation of resources was a principal factor in performance failure. Further,
management has the final word on allocation of resources and teams must develop good
relationship with managers to acquire resources. Managers must weigh the needs of the
business-unit and the needs of the team when determining distribution of resources.
Reviewing performance. Reviewing performance is the third component of Mohrman et al.'s (1995) performance management model. Reviewing performance supports the other performance management factors, because performance review determines if performance definition was valid or needs modification. Performance reviews can also revel performance deficits in the performer or situation which can then be addressed through performance development.

Moreover, Mohrman et al. (1995) contended that the general goal of performance review is to determine the organizational value of performance. Reviews of performance can include: (1) the skills and resources of the performer; (2) the extent to which the work was organized and carried out by the performer; (3) the degree to which performance meets the needs of the performer's larger system; (4) the degree to which performance met the needs of key stakeholders; and (5) the extent to which performance progressed from baseline measure to goal attainment. Thus, performance reviews must determine the direction of performance and if direction has changed; performers can then be directed to new goals or to original goals.

Mohrman et al. (1995) also indicated that performance reviews should be performed at different levels (e.g., organization level, business-unit level, team level, and lateral team level), and can include self-reviews by teams, peer reviews, co-performing team reviews, reviews by managers, and customer reviews. Peer reviews should be an integral, formal part of an individual's performance appraisal and are particularly useful for individual developmental purposes, since the individual's performance depends on his or her contribution to the team. Further, co-performing team and manager reviews tend
to support business-unit development. Manager reviews generally focus on comparisons between teams and individuals, since managers are often responsible for allocating resources to teams and individuals and must be aware of performer’s capabilities.

Customer reviews tend to focus on the product of service and if customer needs are met. Mohrman, Cohen, and Mohrman cautioned against overemphasizing customer performance evaluations, since organizational direction may include other factors that the performer must consider, and not just customer needs.

Finally, Mohrman et al. argued that performers should be evaluated frequently and on performance under their control. Reviews should be performed frequently to ensure that performance definitions are appropriate, to identify additional developmental needs, and to make sure that yearly reviews are summaries of more frequent reviews. Control variables for teams include the ability to organize themselves, the ability to have influence over teammates, and the ability to influence team resources.

**Rewarding performance.** The last component of Mohrman et al.’s (1995) performance model is rewarding performance. Mohrman et al.’s research found evidence that: (1) the more rewards emphasized individual performance, the worse team performance was; (2) rewarding team performance was related to higher team performance, business-unit performance, and to process improvements by teams and business-units; and (3) the impact of rewards was mainly due to defining, measuring, reviewing, and evaluating performance. However, Mohrman et al. found that most individuals appear to base their reward logic on traditional merit-pay systems. Thus, organizational constituents reward logic must be changed before team-based reward
systems can be perceived as fair. Reward systems can include skill-based pay, team bonus pay, profit-sharing and gain-sharing, or, the current reward system can be amended so that minimum disruption occurs. Before reward systems are changed, however, managers should first establish systems for defining, developing and reviewing performance.

Facilitators

The last component of Mohrman et al.'s (1995) framework for effective team-based organization are facilitators--integration, timely decision-making, and efficacy. To develop the facilitation abilities of organizations, Mohrman et al. argued that organizational systems have to be purposefully designed to encourage new methods of performing. Hackman (1990) for example, argued that a supportive organizational context includes reward systems, educational systems, and information systems. In a team-based setting, reward systems should emphasize task-oriented collaboration; educational systems should provide training or technical assistance when groups do not possess the needed knowledge, skills, or experience for performing work, and should be available when groups need the assistance; and information systems must include information necessary for the development of task- or situation-appropriate strategy selections. Organizational context variables that support organizational member efficacy have been discussed--see May and Schwoerer's (1994) Model for Fostering Work Team Efficacy and Effectiveness section in this paper. Decision-making has also been discussed--see the Decision-Making section in Mohrman et al.'s (1995) Framework For Effective Team-Based Organizations; and the Decision-Making section in Sundstrom et
Lateral Integration Mechanisms

For example, Galbraith (1994) indicated that lateral integration mechanisms can be informal or formal. The choice of informal or formal integration mechanisms may depend on cost, since more complicated forms of integration can complicate decisions and take additional time and effort to maintain which increase costs. Further, Galbraith mentioned three types of formal and informal lateral integration mechanisms: (1) voluntary coordination; (2) formal groups; and (3) the integrator role. In voluntary organization, managers perceive situations and communicate with other managers or personnel directly to resolve issues. Top management is informed but not directly involved. Voluntary organization is the simplest and easiest to use informal lateral organization. In more complicated situations, formal groups (e.g., boards, councils, or cross-functional management teams) may be used to make decisions, guarantee coordination, and increase accountability. Formal groups are more expensive, since they are less "natural" than voluntary groups, are usually utilized in addition to voluntary organization, and can require time and effort to maintain. Finally, the most complex form of integration is the integrating role—full-time leadership. Galbraith argued that the integrating role usually performs tasks under the purview of the general manager and is established without formal authority for the integrator—the authority still resides in the hierarchical structure of the organization. Thus, integrators must be carefully chosen. Integrators must be individuals who can influence without authority and must be given
additional power bases that augment their influence and power. Integrators need some power and influence to handle conflicts between departments and different perspectives, and the power and influence needed depends on the context of the integration role. For example, large differences between units may require more influence and power. The integrator role is the most expensive, since it is a full-time role and is established in addition to formal groups and voluntary coordination. The following discusses design choices that increase the power and influence of integrator roles.

**Design Issues for Integrator Roles**

Galbraith (1994) indicated several design issues for integrating roles that can increase their power, including structure, staffing, status, information systems, planning processes, reward systems, responsibilities, and budgets. For example, structure of the role refers to the reporting relationship of the integrator. In many cases a common structural method is to have individual performing integrator roles report to the general manager. Further, staffing is important for integration, because the individual must have knowledge of the integrated departments, technical knowledge, and the ability to influence individuals without the use of authority (e.g., low ego needs and high interpersonal skills). Status is important to the integration role because the organization can increase or lower status and rank by appointing high-status individuals to the role. Further, information systems assist integration by giving individuals information on project costs, profits, scheduling, and goals. Information systems should be consistent across the organization and, in some cases, between companies, and individuals should be able to integrate their databases. Planning processes are important for organizational
integration since planning processes based on valid data and that involve key personnel help resolve conflicts, make trade-offs, and align goals.

In addition to other design choices for integrator roles, Galbraith (1994) proposed that reward systems, responsibilities, and budgets are methods of increasing integration. Reward systems help integration, since they allow for planned outcomes to be rewarded. Further, reward systems, planning processes and informational systems are an integrated package, because the reward system is based on goals determined by the planning process and the planning process depends upon an information system to acquire data to make plans. Responsibilities (e.g., assigning budget responsibilities to integrators) is another method for developing a power base among integration roles. By giving responsibility to integrators, the integrator role becomes clarified and legitimate. Lastly, budgets are a way of increasing the power base of the integrator role. Through control of budgets and money in regard to issues that require coordination, the integrator can influence other organizational constituents.

Integrating Information Systems

Galbraith (1994) also argued that integration can occur in organizational information services. For example, informational integration can be enhanced through: (1) interdepartmental rotation so that individuals are rotated between important roles and become more sensitive to issues between departments; (2) physically co-location of important roles; (3) the development of information technology networks such as a personnel database, and communication links among functions, or interdependent functions; (4) interdepartmental events, such as training and team building with other
functional departments; (5) mirror-image departments where functions are arranged so that each function presents one interface to other functions and individuals do not have to communicate with vast numbers of departments when relying key information; and (6) consistent reward and measurement systems.

Summary

Mohrman et al. (1995) offered an elaborate and detailed framework for developing team-based organizations based on the information-processing needs of organizations. Their framework includes: (1) organizational strategy; (2) the nature of the task; (3) key design features, such as team attributes, multiteam linkages, management structure and roles, integration processes, and performance management processes; and (4) facilitators, including integration, timely decision-making, and efficacy. Through team attributes, multiteam linkages, management structure and roles, integration processes, and performance management processes, organizational conditions are developed that create integration, timely decision-making, and efficacy. Thus, organizational elements such as human resource systems, managerial practices, decision-making, information-sharing processes, and organizational strategies and goals, in addition to the team's internal processes, help to create an organizational context that promotes effective team functioning. Functioning can be assessed by effectiveness criteria at the team level, business unit level, improvements in learning, and employee satisfaction. Mohrman et al.'s work is an essential reference in identifying systems that support team-based organizations and employee collaboration.

In the next section of this paper, attention is given to organizational systems specific to supporting knowledge-based work teams. McDermott's (1995) work is reviewed in terms of organizational systems that support knowledge-based work teams. For information on how to organize production-based teams, see the Sociotechnical Systems Theory section in this paper.

McDermott (1995) offered a framework for designing collaborative knowledge-based work systems that shifts the focus of knowledge development from an individual level to the team level. Further, McDermott argued that five issues need to be addressed when designing knowledge work teams: (1) when interacting with other experts, knowledge-based team members have difficulty communicating, relating to concerns, and assisting in other's work; (2) personal and functional goals are often in conflict with customer and other teams' goals; (3) the work of other team members is often invisible and inaccessible; (4) the functional structure of the organization and management personnel often interfere with effective collaboration; and (5) ineffective patterns, such as lack of follow-through on promises to collaborate, repeat time and time again. McDermott offers several suggestions to address these issues in knowledge work generation and development.

Overview

For example, to work collaboratively, McDermott (1995) argued that organizations must make three key shifts: (1) make knowledge work visible to others; (2) develop a public space for teams; and (3) develop collective learning mechanisms.
The following discusses these key shifts and their components in more detail.

McDermott's model is presented in Figure 13.

Figure 13. McDermott's (1995) Key Transformations in Knowledge Work.

Making Knowledge Work Visible

For instance, McDermott (1995) proposed that visible knowledge work involves aligning goals, streamlining work, applying knowledge systematically, and standardizing work processes and content. Through processes that make work visible to others, knowledge workers can build on one another's ideas, provide assistance, and determine when their expertise might be helpful. The components of making knowledge work visible--aligning goals, streamlining work, applying knowledge systematically, and standardizing work processes and content—are discussed below.

Goal alignment. McDermott (1995) proposed that one method for visible knowledge work is aligning goals. Goal alignment allows team members to understand their contributions and why their contribution is important. Components of goal
alignment include identification of the business process to which the knowledge worker contributes and identification of business process elements, such as outputs, customers, and customer requirements. Further, goal alignment includes "ownership" of long-term business goals by knowledge workers and consequences when goals are not achieved. Ownership of goals is importance, because knowledge workers must understand the “whole picture”, including the connection between projects, business and market implications of projects and issues, and how functional areas contribute to a project. Thus, aligned goals helps focus knowledge workers on ideas and can create a deeper understanding of organizational concerns and issues.

Streamline work. Another component of making knowledge work visible includes streamlining work. Further, McDermott (1995) argued that streamlining work can occur in three ways: (1) eliminating nonvalue added work; (2) identifying areas that can be developed simultaneously; and (3) creating mechanisms for the continuous flow of information between specialties. Eliminating nonvalue added work, such as minor project reviews or unnecessary sign-offs by management, streamlines work processes, since knowledge workers have additional time for project completion. Work can also be streamlined by developing areas simultaneously, which can decrease the time needed for completing project. For example, developing areas simultaneously occurs when work is started on subprocesses of a project before other subprocesses are finished. Continuous flow of information between specialties and sharing of incomplete information can streamline work by eliminating the “flood” of information which occurs when work is transferred to other departments and by allowing knowledge workers input to key stages
of project development. For example, information sharing is a key method of inviting knowledge workers into each other’s territories. Viewing incomplete information allows knowledge workers to see the logic of ideas as they unfold and begin development of project components in advance.

**Systematize the application of knowledge.** Another method of making knowledge work visible is to systematize the application of knowledge. To systematize knowledge application, McDermott (1995) suggested that collaborative teams should have access to project management tools designed so that all team members can easily acquire key information, including progress on the project, upcoming problems, unresolved issues, and areas currently under development. Further, knowledge work teams need process maps that list different work processes and important decisions. For example, a processes map might list the phases of project development, the stages of project development for each phase, the activities of project development for each stage, task checklists, and topics and outcomes that must be decided under each stage. By utilizing publicly shared and publicly available project management tools, team members have access to information and a shared-decision process that serves as a “road map” for determining actions among team members.

**Standardize work processes and work content.** An additional method offered by McDermott (1995) for making knowledge work visible was to standardize work processes and work content. For instance, McDermott suggested two methods for standardization that facilitate collaborative knowledge work teams: (1) standardized work processes and (2) standardized work content. Standardized work processes (e.g.,
similar methods of performing work) are most valuable when processes are utilized over successive work cycles. Standardized work processes are beneficial, because knowledge workers begin to develop a common language and redundancy is decreased, since work processes are not "reinvented". Standardized knowledge work procedures, however, should be general enough to pertain to a wide variety of situations and should not force individuals to use step-by-step procedures. The standardization of work content (e.g., standardized parts or standardized component interfaces) takes systematic processes to an additional level, because standardized components increase the ability of team members to fit work together. Standardization of work content can also facilitate additional projects, since standardized parts from previous projects can be used.

Focus innovation. Another component related to visible knowledge work is focus innovation. McDermott (1995) claimed that by streamlining and standardizing work, team members are able to focus on key, innovative areas. Focus occurs, because most areas of the project are steady and time can be spent on the difficult areas requiring the most learning. Further, focused team members can develop a "synergy" that can increase innovation. Different ideas, diverse views, and contradictory insights can develop team member's learning and build knowledge that may be used for competitive advantage. Further, McDermott claimed that focused innovation may becomes increasingly important in the future, since more manufacturing will be performed by "white-collar" employees as businesses shift to knowledge application processes.
Working in Public

In addition to making knowledge work visible, another component offered by McDermott (1995) for knowledge-based work systems is working in public. Working in public involves the creation of public space, the creation of dialogue, the alignment of structures and policies, and the development of self-management tools. Working in public allows team members to share unfinished ideas, discuss incomplete results, and to participate in deliberations. In addition to sharing important information, public space provides team members a work area to address issues and create new ideas. The components of public space—the creation of public space, the creation of dialogue, the alignment of structures and policies, and the development of self-management tools—are discussed below.

Public space. McDermott (1995) argued that the public space for teams—establishing team boundaries by co-locating team members—increases face to face communication and creates a “symbolic” value, since teams can develop team-based norms that are signified by the physical space of the team. For example, offices can be arranged to provide public and private spaces that facilitate decision-making, “deeper” conversation, and that increase the likelihood of informal communication. Further, public spaces can create less needs for formal meetings and increase the natural flow of work, since team members are co-located. McDermott cautions, however, that the co-location of team members is not a substitute for other communication mechanisms, such as common databases or project management tools.
Create dialogue. According to McDermott (1995) another method of working in public is to create dialogue among team members. McDermott claimed that effective team work and successful product innovation is produced by sharing information and building on other's ideas. Further, ideas are created through dialogue and by thinking with other individuals. Public dialogue and thinking involves disagreement, openly speaking about ideas, and listening to viewpoints. Other team member skills are important, since individuals must have enough understanding of their team member's expertise to speak their language and understand their issues.

In addition, McDermott (1995) proposed that differences in knowledge-based work systems can be addressed by methodological and emotional tasks. Methodological tasks involve the creation of forums where perspectives are exchanged and individuals are asked to articulate their knowledge, assumptions, and perspectives. The forums provide value to knowledge-based work systems by creating a common framework among team members. Emotional tasks involve the creation of atmospheres where individuals can openly discuss and question perspectives and still respect other's viewpoint. Instead of right or wrong or defending positions, an emotional attitude is present that supports collective inquiry into topics.

Aligning structures and policies. Another method for working in public is to align organizational structures and policies. McDermott (1995) referred to the alignment of organizational structures and processes as the development of organizational priorities and processes to support cross-functional task operations. In contrast, many companies are organized around functions and their long-term perspective tends to support
functional priorities. Thus, reward systems, management and personnel policies, and staff support functions need to be aligned into a cross-functional logic and into an organizational context that supports collaboration among individuals and organizational entities.

**Self-management tools.** Self-management tools are another method for working in public. McDermott (1995) proposed that as organizations structure work into cross-function teams, the role of management shifts from an emphasis on managing individuals to an emphasis on managing business processes. Further, once this shift occurs, team members can assume responsibility for managing components (e.g., determining priorities, planning, and tracking costs and profits) of their processes. However, team members need tools to perform self-management functions. For example, systematic key processes and standardized project management tools can provide team members the information they need and a clear indication of their interdependencies. Further, team members can benefit from other skills, such as the ability to express viewpoints, listen to others, build collaborative goals, and negotiate.

**Collective Learning in Action**

McDermott (1995) argued that another critical component of knowledge-base work systems is collective learning. Important components of collective learning involve the creation of shared learning-in-action cycles and the developing of ongoing forums for learning. Collective learning allows team members to benefit from knowledge and develops the team's "cutting edge". The following discusses the two components of
collective learning—the creation of shared learning-in-action cycles and the developing of ongoing forums for learning—in detail.

**Creating shared cycles of learning.** McDermott (1995) argued that collaboration intensifies over time and that collective learning facilitates this intensification. However, to develop intensive levels of collaboration among knowledge workers, organizations must create mechanisms to develop collective learning. McDermott argued that learning requires: (1) the acquisition, storage and application of knowledge; (2) the ability to observe, reflect, plan, and implement knowledge; and (3) the ability to observe and define problems rather than just solve them. For instance, organizations can help create cycles of learning by identifying examples, cases, and experiences that provide examples of patterns team members can build upon; by identifying innovative areas and asking team members to discuss opportunities in these areas; and by providing opportunities for individuals to collaboratively discuss issues while learning can be recalled and patterns can be viewed. Learnings from these discussions can then be incorporated into the current work.

**Developing ongoing learning forums.** The last element identified by McDermott (1995) for collective learning in action involves the creation of ongoing learning forums in functional expertise. Whereas cross-functional collaboration has many benefits, knowledge workers need opportunities to stay abreast of knowledge and standardized approaches in their specialties. For example, functional learning centers can be established with learning as the goal. Individuals can meet to discuss new developments and new approaches. Further, in combination with cross-functional
learning, functional learning centers can serve other useful purposes. For instance, functional learning centers can help organizations develop and implement new ideas and can help organizations address and coordinate multiple change efforts (e.g., project development efforts).

**Conclusion**

McDermott (1995) offered a useful framework for designing collaborative knowledge work teams based on visible knowledge work, development of a public space for teams, and collective learning mechanisms. McDermott, however, offered no research to support his framework, but does offer a case example which illustrates the components of his model. In conjunction with the models of work team effectiveness, McDermott’s work compliments Mohrman et al.'s (1995) framework for designing collaborative work systems and facilitates the processes of identifying systems which support team-based collaboration.

**Organizational and Team Surveys**

This section briefly discusses selected measures of organizational systems and work teams. The intent of this section is to make the reader aware of other measures of organizational systems and work teams and to identify dimensions assessed by these measures. The following discusses Taylor and Bowers' (1972) Survey of Organizations, Hackman and Oldham's (1980) Job Diagnostic Survey, Campion, et al.'s (1993) Work Group Characteristics survey, and Campbell and Hallam's (1992) Team Development Survey.
Taylor and Bowers' (1972) Survey of Organizations

One measure of organizational variables is the Survey of Organizations published in Taylor and Bowers (1972). Taylor and Bower argued that the Survey of Organizations describes organizational conditions and practices in terms of organizational climate, managerial leadership, peer behavior, group processes, and satisfaction. Organizational climate is measured by five indices: technological readiness, human resources primacy, communication flow, motivational conditions, and decision-making practices. Alpha coefficients for the five indices range from .79 to .90.

An additional dimension of Taylor and Bowers (1972) survey is leadership, which consists of eight indices: supervisory support, supervisory goal emphasis, supervisory work facilitation, supervisory interaction facilitation, peer support, peer goal emphasis, peer work facilitation, and peer interaction facilitation. Taylor and Bowers reported scale alpha coefficients ranging from .70 to .94.

Another dimension in the Survey of Organizations is satisfaction. Taylor and Bowers (1972) reported that employee satisfaction is evaluated by measuring workers' satisfaction with: peers; supervisors; the job; the organization compared to others; pay considering the individual's skills and effort; the progress made by the individual in the organization given the individual's efforts; and chances of the individual progressing in the organization. Taylor and Bowers reported alpha coefficients for the items ranged from .75 to .87.

The last dimension in the "Survey of Organizations" (Taylor & Bowers, 1972) is group process. Group process is measured by the extent to which the work group plans
and coordinates efforts; makes decisions and solves problems well; members know their job and perform them well; members share important information; wants to successfully meet objectives; and has trust and confidence among group members. Further the group process dimension also describes if the individual is satisfied with group members and the effectiveness of the group in meetings its mission and goals compared to other work groups. Taylor and Bowers reported alpha coefficients for the items ranging from .55 to .91.

Hackman and Oldham's (1980) Job Diagnostic Survey

Hackman and Oldham (1980) offered the Job Diagnostic Survey for determining if jobs can be improved to increase motivation, performance, and satisfaction and to determine the effects of job redesign. Hackman and Oldham claimed that the Job Diagnostic Survey can be used in most organizations and occupations except for some managerial jobs where role relationships are more likely to be performed. Further, the Job Diagnostic Survey is most useful when respondents are grouped into job categories--test administrators are responsible for ensuring that jobs are grouped appropriately. The Job Diagnostic Survey consists of five dimensions including Job Characteristics, Experienced Psychological States, Affective Outcomes, Context Satisfaction, and Individual Growth Need Strength. The following discusses these aspects of the Job Diagnostic Survey in more detail.

Job Characteristics

Hackman and Oldham (1980) included seven measures of Job Characteristics including skill variety, task identify, task significance, autonomy, feedback from the job,
feedback from agents, and dealing with others. Skill variety describes jobs needing high levels of skills and talents, high levels of complex or sophisticated skills, and low levels of simple and repetitive skills (reverse coded). Task identity indicates jobs involving a whole and identifiable piece of work, work that is performed from beginning to end, and work in which individuals completely finish pieces of work (reverse coded). Task significance determines if other individuals are influenced by the work, if the work is important in the broader scheme of the organization, and if the work is considered significant or important. Autonomy refers to the extent that individuals decide how to do work, that individuals are independent and free to perform work, and that individuals can use personal initiative or judgment performing work. Job feedback indicates if jobs provide clues about performance, if performance of the job provides chances for feedback, and if jobs provide information about performance. Feedback from agents determines if supervisors or co-workers provide feedback about job performance. Finally, dealing with others refers to jobs requiring close work with others, cooperative work, or if the job can be performed by one person (reverse coded).

**Experienced Psychological States**

Another dimension in Hackman and Oldham's (1980) Job Diagnostic Survey is Experienced Psychological States, which consists of three broad measures: experienced meaningfulness of the work, experienced responsibility for the work, and knowledge of results. Experienced meaningfulness of the work describes if job tasks seem useless or trivial to the person and co-workers (reverse coded) or is meaningful to the person and co-workers. Experienced responsibility for the work describes if an individual feels
personal responsibility for the job, personal credit or blame for results, that job
performance is the individual's responsibility, or no responsibility for job performance
(reverse coded). Knowledge of results measures the extent that an individual or others
know if work is satisfactory, or if it is hard for the individual or others to determine if
performance is good or poor (reverse coded).

Affective Outcomes

An additional dimension in Hackman and Oldham's (198) Job Diagnostic Survey
is Affective Outcomes, which is measured by three components: general satisfaction,
internal work motivation, and growth satisfaction. General satisfaction refers to job
satisfaction, satisfaction with the work done, if the individual or others feels like quitting
the job (reverse coded), and if others are satisfied with their job. Internal work
motivation measures satisfaction when the job is done well, if others feel bad or unhappy
when they perform poorly, if individual feelings are affected by job performance, (reverse
coded), if the individual's opinion increases if the job is done well, if personal satisfaction
increases when the job is done well, and if the individual feels bad or unhappy when
performance is poor. Growth satisfaction indicates if the job meets personal growth and
development needs, creates worthwhile accomplishments, fosters independent thought
and action, and creates challenging work.

Context Satisfaction

Hackman and Oldham's (1980) Job Diagnostic Survey also includes a Context
Satisfaction dimension, which includes four components: satisfaction with job security,
satisfaction with compensation, satisfaction with co-workers, and satisfaction with
supervision. Satisfaction with job security measures the amount of job security and the future security of individuals. Satisfaction with compensation refers to pay and fringe benefits and if individuals feel they are fairly paid. Satisfaction with co-workers indicates if individuals are satisfied with whom they talk and work with, their opportunities to know others, and their opportunities to help others. Satisfaction with supervision measures the overall quality of supervision, respect and fair treatment from supervisors, and support and guidance from supervisors.

**Individual Growth Need Strength**

Finally the last dimension in Hackman and Oldham's (1980) Job Diagnostic Survey is Individual Growth Need Strength, which includes two components: a would like component and a job choice component. The would like component measures opportunities to have stimulating and challenging work, to exercise independent thought and action, to learn new things, to be creative and imaginative, to receive personal growth and development, and to have worthwhile accomplishments. The job choice component forces individuals to decide between: good pay versus creativity and innovation, a routine job versus unfriendly co-workers, a respectful and fair supervisor versus constant opportunities to learn new and interesting things, a job with little freedom and independence versus poor working conditions, satisfying teamwork versus a job which requires skills and abilities be used to the fullest, little or no job challenge versus isolation from coworkers, opportunities for advancement and to develop new skills versus extra vacation time and fringe benefits (reverse coded), a chance of being laid off versus unchallenging work (reverse coded), a critical supervisor who discusses work in front of
co-workers versus a job which prevents using highly developed skills (reverse coded),
work in an financially unstable organization versus a job with no input on scheduling or
work procedures (reverse coded), a job where responsibility is given to those who do the
best work versus a job where responsibility is given to employees with the most seniority
(reverse coded), and a job which requires the individual to make important decisions
versus a job with pleasant coworkers (reverse coded).

Campion, Medsker, and Higgs (1993) Work Group Characteristics

Campion et al. (1993) developed the Work Group Characteristics to examine
relationships between work group design characteristics and work outcomes. Further, the
Work Group Characteristics measures work effectiveness using the following
characteristics: job design, interdependence, composition, context, and process. Work
group effectiveness was evaluated by using productivity and employee satisfaction
measures. Campion et al., using exploratory principal components analyses, found 19
factors explaining 73% of the variance. Alpha coefficients for the 19 factors ranged from
-.47 to 0.90. Job design measured five broad dimensions: self-management,
participation, task variety, task significance, and task identity. Interdependence measured
task interdependence, goal interdependence, and interdependence of feedback and
rewards. Compensation determined a group's heterogeneity, flexibility, relative size, and
the group member's preference for group work. Context measured training, managerial
support, and communication and cooperation between groups. Finally, the process
dimension measure potency, social support, workload sharing, and communication and
cooperation within groups. Campion et al. warned that the scales with low reliability should be interpreted cautiously.

Campbell and Hallam’s (1992) Team Development Survey

Campbell and Hallam (1992) developed the Team Development Survey to provide information to teams on what they do well and to identify areas where the team can improve. Factor scores and reliability measures were not provided. Campbell and Hallam measured four broad dimensions: resources, use of resources, improvement, and team success. The resource dimension measures commitment, competence, material resources, time and staffing, and information. The use of resources dimension measures mission clarity, leadership, planning and organizing, team unity, empowerment, and individual goals. The improvement dimension assesses conflict resolution, innovation, team assessment, feedback, and rewards. Finally, the team success dimension measures satisfaction, performance, and computes an overall index of team success.

Hypotheses

From the review of the literature, several issues have been identified which may elaborate on the relationship between perceived organizational support, effectiveness, empowerment, and other aspects of organizational structure (e.g., single-functional versus multi-functional teams). For each hypothesis, the perceived importance and the perceived presence of organizational support, are evaluated. The importance of organizational support represents how employees perceive the importance of support systems in regards to performing work. The presence of organizational support represents how employees perceive organizational support in terms of describing their work environment. Research
questions are discussed briefly below and hypotheses are developed from these research questions.

Relationship Between Support Systems

One research question concerns the importance of support systems relative to one another, and differences between employees' perception of importance of organizational support and presence of organizational support, in their work environments. For instance, there appears to be little empirical research evaluating differences between employees' perception of important organizational support and employees' perception of available organizational support in their work environments. The differences between important organizational support and available organizational support may be viewed as a measure of satisfaction. Further, given that many organizations are structured according to classical management principles (Lawler, 1992), it seems likely that employees will be less satisfied with current perceptions of organizational support than with what employees might consider "ideal" organizational support. Thus, the following is hypothesized.

H1A. Employees' perception of important organizational support (Importance scores) will be significantly higher than employees' perception of available organizational support (Presence scores).

Additionally, whereas Mohrman, Cohen, and Mohrman, (1995) argued that performance definition had the highest relationship to effectiveness, Sims and Manz (1994) argued that leadership is the most critical component of team effectiveness. The models of team effectiveness identify different organizational components of team
effectiveness, but do not specify which types are most related to effectiveness. Thus, the following is hypothesized.

**H1B.** Performance definition and direct supervision support will be perceived as the most important organizational support.

**Organizational Support and Team Type**

An additional research question concerns the relationship of organizational support and team type. For instance, Hackman (1990) presented evidence for different support needs as a function of different team tasks. Klein (1994) discussed differing support challenges for single-functional and multi-functional teams. Mohrman et al. (1995) argued that there are support challenges for teams with differing durations (e.g., teams with short time spans and "permanent" teams). However, little empirical evidence exists to evaluate the perceived importance or presence of organizational support as a function of team tasks, temporary versus permanent teams, or single-functional versus multi-functional teams. Thus, the following is hypothesized.

**H2A.** The Importance and Presence of organizational support will vary for different team tasks.

**H2B.** The Importance and Presence of organizational support will vary for single- or multi-functional teams.

**H2C.** The Importance and Presence of organizational support will vary for temporary or permanent teams.

**H2D.** The Importance and Presence of organizational support will vary for team tasks, single-functional or multi-functional teams, and temporary or permanent teams.
Support Systems and Empowerment

Another research question concerns how teams with different levels of empowerment (see the Empowerment section in this paper) affect the perceived importance and presence of organizational support. For example, Kirkman and Rosen (1996) measured empowerment in terms of Potency, Meaningfulness, Autonomy, and Consequences. Kirkman and Rosen found evidence to suggest that team empowerment was related to empowering leader behaviors, responsibility for external customers, access to information, access to resources, inter-team coordination, and the development of team procedures and rules. This suggests that compared to teams with lower levels of empowerment (Potency, Meaningfulness, Autonomy, and Consequences), teams with higher levels of empowerment may also have higher levels of organizational support. Therefore, the following is hypothesized.

**H3A.** Perceived Importance and Presence of organizational support will be greater for team members in highly empowered teams (Potency, Meaningfulness, Autonomy, and Consequences) compared to teams with low levels of Empowerment.

Support Systems and Team Membership

Additionally, organizational support may vary as a function of team or nonteam membership. Organizational contexts are the most important determinant of team effectiveness (Mohrman et al., 1995). However, it is unclear whether this research finding extends to organizations who utilize individuals, not teams, as the basic performing unit. Given the importance of organizational contexts to effective teams (Cohen, 1994; Hackman, 1988; Sundstrom De Meuse, & Futrell, 1990) and the role
supervisors play in educating team members on team-based organizational contexts (Sims & Manz, 1994), it seems likely that team members might perceive organizational support as more important, and perceive higher levels of organizational support in their work settings, compared to nonteam members. This suggests the following hypothesis.

**H4A.** The perceived Importance and Presence of organizational support will be higher for team members compared to nonteam members.

Furthermore, empowerment depends in part upon the resources available to individuals and teams, since employees need the resources and the support to make decisions and improve work processes (Lawler, 1992; Mohrman et al., 1995). Empowerment, however, may play a moderating role in terms of perception of organizational support by team and nonteam members: Highly empowered nonteam members may perceive organizational support similarly to highly empowered team members, since the organization is providing the resources that influence perceptions of empowerment. Thus, there might be an interaction effect, where team members and highly empowered nonteam members perceive organizational support significantly higher than nonteam members. This suggests the following hypothesis.

**H4B.** The perceived Importance and Presence of organizational support will be higher for team members and empowered nonteam members, compared to nonteam members.

**Organizational Support and Team Output**

Another research question concerns how perceived importance of support systems may vary depending on the service or product provided by the team or work unit. For
instance, McDermott (1994) argued that knowledge work can be classified according to the level of knowledge produced by the team: information processing, technical and service providers, service delivery, and knowledge creation systems. Work may also be classified into production-based settings.

However, perceived importance of organizational support systems may be different depending on the output of the system. For instance, when outputs are physical, organizational informational support systems (e.g., quality, waste, or errors per hundreds) may be a critical resource to the team (Pasmore & Gurley, 1990). In knowledge creation systems, common databases and direction-setting mechanisms may be a critical resource (Mohrman et al., 1995). Thus, the following is hypothesized.

**H5A.** Perceived Importance and Presence of support systems will vary according to the primary output (physical goods, technical and service providers, service delivery systems, or knowledge creation systems) of the team or work area.

**Organizational Support and Knowledge Development Stage**

Knowledge creation systems may also have different support needs depending on the stage of knowledge development--discovery, exploration, testing, or implementation stages (Purser & Pasmore, 1992). For example, Purser and Pasmore (1992) argued that management behaviors must change during the implementation stage when production schedules become more critical. Further, during the exploration phase, information systems that store the results of deliberations (i.e., the exchange and communication of topics in forums that help reduce uncertainty; Pava, 1986) may be a critical
organizational support system (Purser & Pasmore, 1992). This suggests the following hypothesis.

H6A. Workers in knowledge creation systems will perceive the Importance and Presence of organizational support differentially as a function of knowledge development stage (discovery, exploration, testing or implementation stage).

Support Systems and Work Team Effectiveness

Another important research question concerns the combination of systems needed to support effective teams. Little research exists concerning which organizational systems (e.g., Reward) are most important to supporting effective teams. The team effectiveness models specify different types of organizational support, but not which of these are most related to team effectiveness. Mohrman et al. (1995) argued that Performance Definition was most related to effectiveness. However, their research appears to have been limited to performance management systems (i.e., Defining Performance, Training, Performance Appraisal, and Rewards). Thus, the following is hypothesized.

H7A. Perceived Importance and Presence of organizational support will differ as a function of team effectiveness (e.g., high, medium, or low perceived effectiveness).

H7B. Perceived Importance and Presence of organizational support will differ in terms of their relationship to perceived Effectiveness.

The last research question in this section concerns multiple systems that can support effective teams. Evaluation of multiple systems needed to support team effectiveness is important, since behavior in organizations is determined by multiple
systems (Lawler, Nadler, & Mirvis, 1983). Whereas interventions on one system might produce a specific impact for the team, interventions on other systems might also produce the desired impact (Lawler et al., 1983). Further, some support systems (e.g., a reward system) may be critical to team effectiveness, even if other support systems are not significant determinants of team performance. Other support systems, however, in combination or separately, may "compensate" for support systems that are less effective or under development. Thus, the following is hypothesized.

**H7C.** Perceived Importance and Presence of organizational support can vary for effective teams (e.g., different teams with high levels of perceived Effectiveness).

**Support Systems and Supervisor Style**

The last research question addressed in this research study concerns the relationship of Support Systems Survey Importance and Presence scales and supervisor style. Ray and Bronstein (1995) argued that teams can be categorized into a continuum from traditional leader-focused teams to self-led teams. Team leaders have different roles as a function of the team's ability to perform job responsibilities. Further, Sims and Manz (1994) argued that there are at least four types of leadership strategies, each of which has different roles in terms of how they interact with employees. Sims and Manz description of a "SuperLeader" suggest that leaders who focus on developing the internal capabilities of team members will educate individuals on the availability and importance of resources within the organization context. Thus, the following is hypothesized:

**H8A.** Perceived Importance and Presence of organizational support will vary as a function of supervision style.
CHAPTER III

METHOD

This chapter is broken into four sections: a Subjects section, an Instruments section, a Test Construction section, and the Procedure section. The Subjects section describes subject matter experts who critiqued the survey and individuals who completed the surveys. The Instruments section describes the different surveys utilized in this research project. The Test Construction section details the methods used in developing the Support Systems Survey and the Effectiveness survey. The Procedure section describes the methodology used to contact subjects and provide feedback reports.

Subjects

Subject matter experts for selecting Support Systems Survey items were chosen based on their expertise with teams and were balanced in terms of academic and consulting experience. James Barker, William Pasmore, Gayle Porter, and Ray Miles were considered academics; Amy Archambeau, Jill George, Pete Sorenson, and Earl Weed were considered consultants. These individuals have extensive theoretical and practical experience with teams and team related issues. For instance, several of William Pasmore's publications have been previously discussed, including Pasmore, (1982), Pasmore (1988), Pasmore and Sherwood (1977), Pasmore and Sherwood (1978),

Subjects who completed the Support Systems Survey, Kirkman and Rosen's (1996) Empowerment Survey, and the Perceptions of Team Performance Survey, were 400 individuals (113 females, 263 males; 24 individuals did not designate a gender on the demographics form) recruited from companies in the United States and Canada including Shell Oil Company, GTE Directories, Mallinckrodt Baker (check), Inc., Tipco Services, Westinghouse Canada, and Defense Contract Management Command. Subjects who completed surveys originally consisted of 407 individuals. Seven individuals were dropped from the data file as multivariate outliers (see Assumptions of Multivariate Statistics and Multivariate Outliers in the Results section). Three individuals did not identify a company when completing the survey. One company inadvertently failed to copy the empowerment and effectiveness surveys (N is approximately 30). These individuals were left in the data set for other analyses.

Subjects were recruited from a National Science Foundation (NSF) study; the Center for the Study of Work Teams' web page, which advertised the study; and the Center for the Study of Work Team's conferences, where flyers advertising the study were presented. Subjects from the NSF study took the survey at no cost. Other companies, however, were asked to cover the expenses of conducting the survey. Companies were willing to cover expenses, because they received feedback reports.

Subjects had a mean age of 42 and reported a mean number of 10 individuals on their teams. Forty-eight percent of the respondents indicated that they did not supervise
other individuals; eighteen percent of the sample indicated that they supervised at least 10 individuals (20 percent did not respond to this question). Eight-eight percent of respondents reported that their organization considered them to work in teams. Fifty-four percent of respondents indicated that their work group had existed for more than three years; twelve percent indicated that their group had existed for less than six months. Seventy-seven percent of the sample worked in the same location as other team members; ninety-four percent of the sample met as a group at least one or two times a month; and sixty-two percent of the sample indicated that they frequently or constantly made work-related decisions.

**Instruments**

The following discusses the instruments used in this research study. Surveys measuring support systems, team effectiveness, and empowerment, are briefly presented below. Additional information on the Support Systems Survey and Effectiveness survey are presented in the next section of this paper.

**Support Systems**

This instrument was developed to evaluate individual perceptions of organizational support for employee collaboration. Information concerning construction of the Support Systems Survey scales is presented under the Test Construction section in this paper.

**Team Effectiveness**

Beyerlein's (1996, unpublished survey) Perceptions of Team Performance scale was adapted to collect data on team performance. The adapted version of the scale is
presented in Appendix A. Additional information on development of the scale is given under questionnaire development.

Empowerment

Kirkman and Rosen's (1996) Empowerment survey (used by permission of the authors) was utilized to measure empowerment. Kirkman and Rosen's survey is presented in Appendix B. The Empowerment survey is based on four scales: Potency, Meaningfulness, Autonomy, and Consequences. The Potency scale is defined according to Shea and Guzzo's (1987) criteria: the collective belief of group members that the group can be effective. The Meaningfulness scale is based on Hackman's (1987) research, that group members should "feel collectively responsible for the products they create, and [should] know, on a more or less continuous basis, how they are doing" (p. 324). The Autonomy scale is also based on Hackman's work. Hackman argued that autonomy refers to a group's ability to influence the process of performing work and the responsibility of the group to outcomes. Finally, Kirkman and Rosen argued that Consequences refers to observable outcomes. For example, a team that can hire, discipline, and fire employees can influence both the composition of the team and the organization.

Kirkman and Rosen (1996) studied 868 individuals in organizations with at least one year of experience implementing teams. Cronbach's alpha was reported as 0.83 for Potency, 0.92 for Meaningfulness, 0.94 for Autonomy, 0.93 for Consequences, and 0.95 for all items. In an extensive test of their empowerment model, Kirkman and Rosen reported that the empowerment survey effectively mediated 98% of the relationships
between team characteristics and outcomes. For instance, empowerment was highly related to job satisfaction, team performance, organizational commitment, team commitment, proactive behaviors, and customer satisfaction. These analyses suggest that the Kirkman and Rosen's empowerment survey is a reliable and valid instrument.

**Test Construction**

In this section of the paper, construction of the Support Systems Survey, Perceptions of Team Performance Survey, demographic questions, and questions to evaluate hypotheses, is discussed. Identification and selection of items is presented. Scale construction is discussed in the Results section of this paper.

**Support Systems Survey**

The support systems identified in the literature review of this paper were used as a basis for selecting items for the Support Systems Survey. Potential support system items are presented in Hall (1997). This information was sorted into categories. The selection of categories were primarily based on Mohrman, Cohen, and Mohrman's (1995) design sequence for team-based organizations. Mohrman et al. arguably offer the most comprehensive framework for understanding team-based organizations. Mohrman et al.'s design sequence includes the identification of work teams (group design), the specification and design of integration processes (integration), the clarification of management structure and roles (executive manager and supervision systems), and performance management systems (defining performance, training, performance review, and rewards systems). An additional category was added for information systems (Cohen, 1994; Hackman, 1987). Potential support systems were sorted into the categories
by the author. The content of the items was assessed and a judgment was made by the 
author in regards to which category it should be placed. No reliability information is 
available for this process.

The categories were then summarized by the author into brief essays. Essays were 
developed by first sorting items with similar content into groups. The author subjectively 
assessed item content when sorting items into groups. Then, items with similar content 
were deleted by the author. The remaining items were summarized into paragraph form. 
See Appendix E for the summaries. No reliability information is available for this 
process.

Potential Support Systems Survey items were based on the information provided 
by the summaries and were written by the author. Items were reviewed and appended by 
Michael Beyerlein, Ph.D. The items are presented in Appendix D.

To ensure that the items accurately reflected important dimensions of team, items 
were reviewed by 8 subject matter experts. Subject matter experts were asked to rank 
each item in terms of importance to team effectiveness on a scale from one to five (e.g., 1 
= damaging to teams; 5 = essential for work team effectiveness). Instructions for subject 
matter experts, including scaling and definitions, are presented in Appendix E.

Subject matter expert rankings were computed into mean item scores (e.g., items 
were summed and divided by the number of rankings). Items were ranked by mean 
scores, and for each category (e.g., Information), items with the 15 highest mean scores 
were chosen to represent that dimension. These items were then repeatedly reviewed by 
the author and Michael Beyerlein for wording. Further, to satisfy dissertation committee
requirements, for each question, the word "work group" or "group" was substituted for the words "work team" or "team." Items were then randomly sorted using a Foxpro 2.6 routine programmed by the author.

The Support Systems Survey is designed so that each item is responded to twice: once for rating the importance of the item for getting work done (Importance scale scores) and again for the extent to which the item is present in the subject's work setting (Presence scale scores). Importance scales represent how subjects perceive the importance of support systems in terms of performing work. Presence scales represent how subjects perceive the support in terms of describing their current work environment. Rankings are made using a one to five rating scale (e.g., 1 = not at all; 5 = to a very great extent). Instructions and the rating scale for the Support Systems Survey are presented in Appendix F. The survey was then pilot tested on three groups of individuals (N=26). No suggestions were made concerning clarity of wording or format of the survey. However, individuals did suggest reducing the number of items on the Support Systems Survey. Support Systems Survey items are presented in Appendix G.

Team Effectiveness

Beyerlein's (1996, unpublished survey) Perceptions of Team Performance Survey was adapted to collect data on team effectiveness. The original Perception of Team Performance survey was developed by Michael Beyerlein, Sue Freidman, Ph.D., and the author. The percentage-based format is similar to effectiveness surveys utilized by Sue Mohrman (Sue Freidman, personal communication). Previous analyses suggest that the original Perceptions of Team Performance survey has adequate reliability for basic
research (Nunnally & Bernstein, 1994). Principal components analysis on the original Perception of Team Performance resulted in a one factor solution accounting for 65.1% of the variance. Corrected item-total correlations ranged from .65 to .83. Alpha reliability for the scale was .94. These analyses were based on a different sample (N = 194).

Effectiveness survey items were identified from Beyerlein's (1996, unpublished survey) Perceptions of Team Performance Survey and from the models of team effectiveness presented in the literature review of this paper. Appendix H lists the effectiveness criteria identified in these models of team effectiveness. All items from the Perceptions of Team Performance Survey were used in the adapted survey. Further, all effectiveness items identified from the team effectiveness models were included, except for redundancies, and when the effectiveness criteria were specific to the study or model in question. These cases are noted in Appendix H.

**Item Writing and Scaling**

Items from Beyerlein's (1996) Perceptions of Team Performance Survey were copied directly from the scale. Items from the effectiveness models were paraphrased. Subjects rank items on the Perceptions of Team Performance Survey by percentages (0% to 100%). The adapted version of the Perceptions of Team Performance Survey is presented in Appendix A.

**Demographics and Questions to Test Hypotheses**

Questions were asked to determine if the individual works on a team, the percentage of teams used in the organization, the task of the team, if the team is
single-functional or multi-functional, if the team is permanent or temporary, and the amount of time the organization has been using teams. McDermott’s (1994) classification of team tasks, including an additional classification for production-based work, and Purser and Pasmore’s (1992) classification of stages of knowledge work were included in the survey. These questions and demographic questions are presented in Appendix I.

**Procedure**

Companies interested in participating in the study contacted the author or other members of the NSF research team. Companies were given a copy of the survey to review, and participation requirements for receiving feedback reports were explained. When appropriate, cost reimbursement was discussed with interested companies. Companies were asked to provide a key contact person who would copy, distribute, and return all surveys. Subjects were asked to read a consent form and were informed that participation was voluntary. Team feedback reports, based on group results, were provided if a specific percentage of team members completed the surveys. The consent form and requirements for receiving feedback reports are presented in Appendix J. Data was collected from June, 1997 to March, 1998.
CHAPTER IV

RESULTS

Scale Construction

The following discusses scale development for the Support Systems Survey, Kirkman and Rosen's (1996) Empowerment Survey, and the adapted version of the Perceptions of Team Performance Survey. Scale computation, mean scores, standard deviations, correlations, and reliability coefficients, are reported for all scales.

Support System Survey

Reliability coefficients using Cronbach's alpha were computed on Importance and Presence scales. To maximize reliability, Importance scale items were examined in terms of corrected inter-item correlations. For each Importance scale, the item with the lowest corrected inter-item correlation was dropped. Table 1 presents reliability coefficients for the initial 15 item scales and the resulting 14 item scales.

Examination of Table 1 indicates that removing items with the lowest corrected inter-item correlation (one item per scale) raised alpha coefficients for four Importance scales (i.e., Information, Executive Managers, Defining Performance, and Group Design) and raised alpha coefficients for three Presence scales (i.e., Executive Managers, Performance Appraisal, and Information). One Presence scale alpha coefficient was lowered by .01 (i.e., Integration). The magnitude of alpha coefficients suggests that the scales are adequate for basic research (Nunnally & Bernstein, 1994). For the interested
reader, an exploratory factor analysis of the Support Systems Survey is presented in Appendix L. However, since the ratio of items to sample size is small for an adequate factor analysis (Stevens, 1986), the results in Appendix L should be approached cautiously.

Table 1

Support Systems Survey: Alpha Reliability Coefficients for Fifteen Item and Fourteen Item Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Fifteen Item Scales</th>
<th>Fourteen Item Scales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Importance Scales</td>
<td>Presence Scales</td>
</tr>
<tr>
<td></td>
<td>Alpha</td>
<td>N</td>
</tr>
<tr>
<td>Information</td>
<td>.87</td>
<td>357</td>
</tr>
<tr>
<td>Executive Managers</td>
<td>.88</td>
<td>340</td>
</tr>
<tr>
<td>Rewards</td>
<td>.92</td>
<td>356</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>.90</td>
<td>350</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>.92</td>
<td>348</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>.89</td>
<td>355</td>
</tr>
<tr>
<td>Training</td>
<td>.93</td>
<td>369</td>
</tr>
<tr>
<td>Group Design</td>
<td>.84</td>
<td>361</td>
</tr>
<tr>
<td>Integration</td>
<td>.84</td>
<td>340</td>
</tr>
<tr>
<td>All Items</td>
<td>.98</td>
<td>.236</td>
</tr>
</tbody>
</table>

To compute Support Systems Survey scales, items from each scale were summed into a composite score (e.g., Tabachnick & Fidell, 1996). Support Systems scales were computed using 14 items per scale. To set a limit on the number of missing values allowed per subject per scale and to utilize as much of the available sample as possible, each subject was allowed to have one item per scale with a missing value. Thus, each
subject must have responded to a minimum of 13 items (out of a possible 14 items) to receive a scale score, otherwise the subject received a system missing value (i.e., a "null" value that is ignored in data analyses) instead of a scale score. Appendix L lists percentages of subjects who have no missing values and the cumulative percentage of subjects with one or no missing values, for each Support Systems Survey scale. This procedure allowed approximately 93% of the sample to receive scale scores and approximately 7% of the sample to receive system missing values.

All Support Systems Survey scales were examined with SPSS FREQUENCIES to evaluate normality and to identify univariate outliers. Seventeen out of eighteen scales were negatively skewed. Examination of the 18 scales revealed that 20 scores (out of approximately 6750 scores) were univariate outliers, \( p < .001 \). These scores were changed to system missing values using the SPSS RECODE command. Appendix N presents the Support Systems Survey scales in terms of the number of items recoded to system missing values, and skewness and kurtosis of the scales before and after outlying scores were recoded to system missing values. Examination of Appendix N indicates that removal of the outliers decreased the skewness and kurtosis of scale distributions. For instance, recoding two Importance Information scale scores to system missing values decreased the skewness of the scale distribution from -0.511 to -0.268, and decreased the kurtosis of the scale distribution from 1.220 to 0.110. Table 2 displays the means, standard deviations, and \( N \) associated with each Support Systems Survey scale.

Examination of Table 2 suggests that subjects view discrepancies between the importance of organizational support and the presence of organizational support in their
work environment. For each scale (e.g., Group Design or Defining Performance), Importance means were higher than Presence means.

Table 2

Support Systems Survey Scales: Means, Standard Deviations, and N

<table>
<thead>
<tr>
<th>Scale</th>
<th>Importance Scales</th>
<th>Presence Scales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Group Design</td>
<td>57.33</td>
<td>6.56</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>55.24</td>
<td>7.65</td>
</tr>
<tr>
<td>Information</td>
<td>54.99</td>
<td>7.16</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>54.85</td>
<td>7.80</td>
</tr>
<tr>
<td>Executive Managers</td>
<td>53.55</td>
<td>7.62</td>
</tr>
<tr>
<td>Training</td>
<td>53.43</td>
<td>8.88</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>51.28</td>
<td>9.69</td>
</tr>
<tr>
<td>Rewards</td>
<td>50.13</td>
<td>10.99</td>
</tr>
<tr>
<td>Integration</td>
<td>49.98</td>
<td>8.07</td>
</tr>
</tbody>
</table>

Further, examination of standard deviations suggests that subjects were more in agreement concerning the importance of organizational support; subjects had larger standard deviations for Presence scores. For Presence and Importance scales, standard deviations were lowest for the Group Design and Information scales. This suggests that subjects were more in agreement concerning the importance and presence of the Group Design and Information scales, compared to other scales.

Examination of Table 2 also suggests that some types of organizational support were perceived as more important than other types. For Importance scales, means were highest for the Group Design scale, followed by the Defining Performance, Information, Direct Supervisor, Executive Manager, Training, Performance Appraisal, Rewards, and
Integration scales. Additionally, subjects indicated a similar pattern for Presence scales. In this case, means were highest for the Group Design scale, followed by the Direct Supervisor, Defining Performance, Information, Training, Performance Appraisal, Executive Manager, Integration, and Rewards scales. These results suggest that employees perceive effective group design as the most important type of organizational support needed to perform work, and organizations are providing this type of support. These results also suggest that employees perceive Rewards as "low" (compared to other scales) in terms of importance to performing work, and low in terms of describing their current work environments.

Finally, Appendix N presents correlations between the Support Systems Survey scales. Examination of Appendix N suggests that correlations between Importance scales are higher than correlations between Presence scales. Further, correlations between Importance and Presence scales are moderately low (compared to inter-scale correlations). This suggests that high relationships exist between systems in an "ideal" work environment, and lower relationships exist between systems in current work environments. Correlations between Importance and Presence scales suggest that there is a low relationship (compared to inter-scale correlations) between an ideal work environment and the current work environment.

Empowerment Survey

Kirkman and Rosen's (1996) Empowerment Survey was used to measure perceptions of empowerment. The Empowerment Survey is based on four scales: Potency, Meaningfulness, Autonomy, and Consequences. See Instruments in the
Methods section for more information on Kirkman and Rosen's Empowerment Survey.

The Empowerment Survey is presented in Appendix B.

Reliability coefficients using Cronbach's alpha were computed on Potency,
Meaningfulness, Autonomy, and Consequences scales and for all items. Alpha
coefficients computed in this study (N = 380 to 387) are comparable to alpha coefficients
reported by Kirkman and Rosen (1996). Reliability coefficients reported by Kirkman and
Rosen (1986) and from this study are presented in Table 3.

Table 3

Empowerment Survey Alpha Coefficients: This Study Compared To Kirkman and Rosen
(1996)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Alpha</th>
<th>Kirkman &amp; Rosen (1996)</th>
<th>Scale</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potency</td>
<td>.83</td>
<td></td>
<td>Potency</td>
<td>.86</td>
</tr>
<tr>
<td>Meaningfulness</td>
<td>.92</td>
<td></td>
<td>Meaningfulness</td>
<td>.91</td>
</tr>
<tr>
<td>Autonomy</td>
<td>.94</td>
<td></td>
<td>Autonomy</td>
<td>.88</td>
</tr>
<tr>
<td>Consequences</td>
<td>.93</td>
<td></td>
<td>Consequences</td>
<td>.90</td>
</tr>
<tr>
<td>All Items</td>
<td>.95</td>
<td></td>
<td>All Items</td>
<td>.95</td>
</tr>
</tbody>
</table>

To compute Empowerment scales, items from each scale were summed into a
composite score (e.g., Tabachnick & Fidell, 1996). Similar to computation of the Support
Systems Survey scales, limits were set on the number of missing values allowed per
subject per scale and as much of the available sample was utilized as possible, by
allowing each subject to have one item per scale with a missing value. Appendix L lists
percentages of individuals with no missing values and a cumulative percentage for
individuals with either one or no missing values, for the Empowerment scales. Subjects with more than one score missing for a scale received a system missing value for that scale. This procedure allowed approximately 95% of the sample to receive Empowerment scale scores. Compared to the other surveys (e.g., Perception of Team Performance) the Empowerment survey had the fewest missing data points.

Table 4 displays the means, standard deviations, and N associated with the Empowerment Survey scales. All Empowerment Survey scale distributions were examined with SPSS FREQUENCIES to evaluate normality and to identify univariate outliers. All the scale distributions were negatively skewed. Examination of the Empowerment scale distributions revealed that 16 scores (out of approximately 1975 scores) were univariate outliers, \( p < .001 \). These scores were replaced with system missing values using the SPSS RECODE command.

Table 4

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potency</td>
<td>46.63</td>
<td>5.88</td>
<td>384</td>
</tr>
<tr>
<td>Meaningfulness</td>
<td>36.03</td>
<td>4.92</td>
<td>385</td>
</tr>
<tr>
<td>Autonomy</td>
<td>30.09</td>
<td>6.90</td>
<td>387</td>
</tr>
<tr>
<td>Consequences</td>
<td>34.64</td>
<td>4.90</td>
<td>381</td>
</tr>
<tr>
<td>All Items (Total)</td>
<td>147.36</td>
<td>19.40</td>
<td>382</td>
</tr>
</tbody>
</table>

Appendix N presents the Empowerment scale distributions in terms of the number of items recoded to system missing values, and skewness and kurtosis of scale distributions before and after outliers were recoded. Similar to Support Systems Scale
computations, removal of several scores reduced the skewness and kurtosis of scale
distributions. For instance replacing four Potency scores with systems missing values
decreased the skewness of the Potency distribution from -1.198 to -0.684, and decreased
the kurtosis of the distribution from 2.564 to 0.152.

Examination of Table 4 indicates that the Autonomy scale had the highest
standard deviation of the Empowerment Survey scales. This suggests that compared to
other Empowerment survey scales, there was lowest agreement among subjects in terms
of responding to Autonomy scale items.

Further, Appendix O presents correlations between Empowerment Survey scales.
Similar to Kirkman and Rosen's (1996) study, Meaningfulness and Consequences had the
highest inter-scale correlation. This suggests that groups with meaningful tasks and goals
are related to groups performing important, customer associated tasks.

Table 5

Means, Standard Deviations, and N for Mean Empowerment Survey Scales: This Study
Compared to Kirkman and Rosen (1996)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Kirkman &amp; Rosen (1996)</th>
<th>This Study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Potency</td>
<td>5.78</td>
<td>0.98</td>
</tr>
<tr>
<td>Meaningfulness</td>
<td>5.67</td>
<td>1.28</td>
</tr>
<tr>
<td>Autonomy</td>
<td>3.91</td>
<td>1.79</td>
</tr>
<tr>
<td>Consequences</td>
<td>5.74</td>
<td>1.24</td>
</tr>
<tr>
<td>All Items (Total)</td>
<td>5.20</td>
<td>1.15</td>
</tr>
</tbody>
</table>

* Based on Group-Level Data
** Based on Individual-Level Data
Table 5 compares the results of these computations with the results reported by Kirkman and Rosen (1996). Results from this study are presented as means (analyses of the Empowerment survey were based on sum scores). Note that Kirkman and Rosen reported group-level results (group members reached consensus on scale items), not individual-level results.

Examination of Table 5 suggests that with two exceptions, results from this study are comparable to Kirkman and Rosen's (1996) research. First, subjects in this study reported higher levels of Autonomy compared to Kirkman and Rosen's subjects. Subjects in this study may perceive higher levels of Autonomy in their work settings, or the manner in which data was collected (group consensus versus individual responses) may have affected the results. Standard deviations are also smaller in this sample compared to Kirkman and Rosen's research. This suggests that individuals in this study were more in agreement when responding to Empowerment scale items.

Perceptions of Team Performance Survey

An adapted version of Beyerlein's (1996, unpublished survey) Perceptions of Team Performance Scale was used to evaluate subjects' perceptions of team effectiveness. See Instruments in the Methods section for more information on the Perceptions of Team Performance Scale. The adapted version of the Perceptions of Team Performance survey is presented in Appendix A.

The Perceptions of Team Performance survey and the adapted version used in this study, is an exploratory instrument. Thus, an additional study of the underlying dimensions and reliability of the survey was performed. Exploratory factor analysis was
used to determine the underlying attributes of the scale (e.g., Campion, Medsker, &
Higgs, 1993; Kirkman & Rosen, 1996). The following briefly discusses the data
screening processes used to meet the assumptions of factor analyses and then results from
the factor analysis are presented.

Data Screening

The Perceptions of Team Performance Survey items were first examined for
univariate outliers (Tabachnick & Fidell, 1996). Twelve of the twenty Perceptions of
Team Performance survey items were found to have outliers, \( p < .001 \). A total of 76
responses (.9% of the responses) were replaced with system missing variables using the
SPSS RECODE command. Mahalanobis distance was then computed with SPSS
REGRESSION to determine multivariate outliers (multivariate outliers are patterns of
responses that are unusual compared to other response patterns; Tabachnick & Fidell,
1996). Perceptions of Team Performance Survey items were independent variables;
idnumber was used as the dependent variable (Tabachnick & Fidell, 1996). Multivariate
outliers identified through Mahalanobis distance (\( p < .001 \)) were removed from the factor
analysis. Removal of univariate and multivariate outliers dropped 36% of the total
sample (N for the factor analysis was 255).

The relatively low number of individuals remaining in the analysis (64%),
compared to the total sample was due to two reasons: (1) one company did not complete
the Perceptions of Team Performance survey (the last page of the survey materials was
not copied); and (2) the Perception of Team Performance survey appeared to have the
highest number of missing data points. Fewer data points for some individuals increased
the likelihood that they were identified as multivariate outliers. However, screening for multivariate outliers is a critical process when performing factor analysis (Tabachnick & Fidell, 1996), and there was sufficient \textit{N} to perform the analysis (Stevens, 1986).

Finally, scale items were examined multicollinearity and singularity (Tabachnick & Fidell, 1996). Squared multiple correlations were computed using SPSS RELIABILITY to determine if items should be dropped before performing factor analysis. Squared multiple correlations ranged from .34 to .82. Thus, all items remained in the analyses.

**Factor Analysis Results**

Principal axis extraction with an oblimin rotation was performed using SPSS FACTOR. Prior to principal axis extraction, principal components extraction was used to estimate the number of factors retained in the final solution (Tabachnick & Fidell, 1996). Four factors had eigenvalues greater than 1.0 for both principal components and principal axis extraction methods. Examination of eigenvalues using a scree plot suggests that a four factor solution is most appropriate. A four factor solution accounts for 66.4\% of the total variance.

Results from the principal axis extraction method and varimax and oblimin rotations, produced a similar pattern of factor loadings. Further, varimax and oblimin rotations using principal components extraction produced the same pattern of factor loadings. Table 6 presents the pattern matrix which results from an oblimin rotation and a principal components extraction method. This pattern matrix is presented, since it appears to have the easiest structure to interpret.
Table 6

Perceptions of Team Performance: Pattern Loading Matrix Using Oblimin Rotation and Principal Components Extraction

<table>
<thead>
<tr>
<th>Question</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfying customers</td>
<td>.88440</td>
<td>.10258</td>
<td>-.03758</td>
<td>.01764</td>
</tr>
<tr>
<td>Responding to customer needs</td>
<td>.85674</td>
<td>.04062</td>
<td>-.06747</td>
<td>-.06625</td>
</tr>
<tr>
<td>Providing quality service to customers</td>
<td>.85336</td>
<td>.05562</td>
<td>.02034</td>
<td>-.07504</td>
</tr>
<tr>
<td>Meeting goals</td>
<td>.62075</td>
<td>-.00733</td>
<td>.16848</td>
<td>-.06290</td>
</tr>
<tr>
<td>Creating quality products</td>
<td>.57682</td>
<td>-.00300</td>
<td>.16048</td>
<td>-.27431</td>
</tr>
<tr>
<td>Trust with leaders and management</td>
<td>-.00307</td>
<td>.87826</td>
<td>.02139</td>
<td>-.02511</td>
</tr>
<tr>
<td>Group member growth opportunities</td>
<td>-.03926</td>
<td>.86095</td>
<td>.04730</td>
<td>.07453</td>
</tr>
<tr>
<td>Satisfaction with the job</td>
<td>.22964</td>
<td>.58148</td>
<td>-.11794</td>
<td>-.31883</td>
</tr>
<tr>
<td>Commitment to the organization</td>
<td>.19878</td>
<td>.49914</td>
<td>.14895</td>
<td>-.11743</td>
</tr>
<tr>
<td>Increased capacity</td>
<td>-.17536</td>
<td>.21357</td>
<td>.81063</td>
<td>-.11150</td>
</tr>
<tr>
<td>Innovation</td>
<td>.04435</td>
<td>-.12894</td>
<td>.68703</td>
<td>-.18488</td>
</tr>
<tr>
<td>Cycle time</td>
<td>.38140</td>
<td>-.08953</td>
<td>.54662</td>
<td>.08844</td>
</tr>
<tr>
<td>Controlling costs</td>
<td>.22899</td>
<td>.09716</td>
<td>.52446</td>
<td>.10463</td>
</tr>
<tr>
<td>Increased production</td>
<td>-.00352</td>
<td>.22240</td>
<td>.45283</td>
<td>-.35951</td>
</tr>
<tr>
<td>Use of expertise on the group</td>
<td>.15744</td>
<td>.09103</td>
<td>.40900</td>
<td>-.25225</td>
</tr>
<tr>
<td>Problem-solving</td>
<td>.00120</td>
<td>-.12168</td>
<td>.16181</td>
<td>-.81326</td>
</tr>
<tr>
<td>Group members are more satisfied with the group than frustrated</td>
<td>.02006</td>
<td>.16786</td>
<td>-.09155</td>
<td>-.79583</td>
</tr>
<tr>
<td>Decision-making</td>
<td>-.01277</td>
<td>-.00100</td>
<td>.12246</td>
<td>-.79390</td>
</tr>
<tr>
<td>Group members' desire to work with the group in the future</td>
<td>.12623</td>
<td>.10290</td>
<td>-.12693</td>
<td>-.72698</td>
</tr>
<tr>
<td>Belief in our ability to perform our work</td>
<td>.23622</td>
<td>.00401</td>
<td>.10393</td>
<td>-.58861</td>
</tr>
</tbody>
</table>

Note that several of the variables correlate highly with several factors. For instance, "creating quality products" correlates highly with factors one and four; "satisfaction with the job" correlates highly with factors two and four; "cycle time" correlates highly with factors one and three; and "increased production" correlates highly with factors three and four. When computing summed scales, items where "assigned" to
factors according to the item's highest factor loading. Further, these loadings suggest that there are four kinds of team effectiveness: Customer Satisfaction, Psychological Effectiveness, Team Effectiveness, and Resource Utilization and Development. These scales are discussed further below.

**Customer Satisfaction.** Customer Satisfaction is composed of five items: meeting goals; creating quality products; satisfying customers; providing quality service to customers; and satisfying customer needs. The underlying attribute for these questions appears to be a team's ability to create quality products and services, and a team's ability to satisfy customer requests.

**Psychological Effectiveness.** Psychological Effectiveness is composed of four items: group member growth opportunities; trust with leaders and management; commitment to the organization; and satisfaction with the job. The underlying attribute for these questions is the extent that organizations create and meet psychological and/or emotional needs of team members. For instance, do group members trust organizational leaders, feel satisfied with their job, and feel committed to the organization?

**Team Effectiveness.** Team Effectiveness is composed of five items: group members' desire to work with the group in the future; group members are more satisfied with the group than frustrated; problem-solving; decision-making; and belief in our ability to perform our jobs. The underlying attribute for these questions appears to be the internal processes of the group: the extent that working with the group is a productive and positive experience, and the extent that individuals work together well as a group.
Resource Utilization and Development. Resource Utilization and Development is composed of six items: controlling costs; cycle time; innovation; increased capacity; use of expertise on the group; and increased production. The underlying attribute for these questions is the extent to which groups use current resources effectively, and the extent to which groups improve work processes.

To compute Perceptions of Team Performance Survey scales, items from each scale were summed into a composite score (e.g., Tabachnick & Fidell, 1996). Similar to the Support Systems Survey and Empowerment scales, each individual was allowed one item per scale with a missing value. Subjects with more than one score missing for a scale received a system missing value for that scale. Appendix L lists percentages of individuals with one missing value and the cumulative percentage for individuals with either one or no missing values, for each Effectiveness scale. This methodology was used to set limits on the number of missing values allowed per subject per scale, and yet to utilize as much of the available sample as possible. This was especially important for the Effectiveness scales: only 86% of the sample received a value for the Resource Utilization and Development scale. Compared to other scales (e.g., Empowerment scales), the Effectiveness scales had the highest percentage of missing data points.

All Perceptions of Team Performance scale distributions were examined using SPSS FREQUENCIES to evaluate normality and to identify univariate outliers. Each scale distribution was negatively skewed. Examination of the scale distributions indicated that 24 scores (out of approximately 2250 scores) were univariate outliers, $p < .001$. These scores were replaced with system missing values using the SPSS RECODE
command. Appendix M presents the Perceptions of Team Performance Survey scale distributions in terms of the number of items recoded to system missing values, and skewness and kurtosis of the scale distributions before and after outliers were recoded. Similar to the other scales, removing outliers decreased the skewness and kurtosis of scale distributions. For instance, when eight scores for the Team Effectiveness scale were changed to system missing values, the skewness of the Team Effectiveness scale distribution decreased from -1.532 to -1.081, and kurtosis for the distribution decreased from 2.719 to 0.759.

Reliability coefficients (SPSS RELIABILITY), means, and standard deviations were computed on Perceptions of Team Effectiveness scales. Means, standard deviations, N, and reliability coefficients are presented in Table 7. The magnitude of the alpha coefficients suggest that the Perceptions of Team Performance scales are adequate for research purposes (Nunnally & Bernstein, 1994).

Table 7

Perceptions of Team Performance Scales: Items per Scale, Means, Standard Deviations, and Reliability Coefficients

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items in Scale</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Satisfaction</td>
<td>5</td>
<td>.82</td>
<td>.12</td>
<td>356</td>
<td>.86*</td>
</tr>
<tr>
<td>Psychological Effectiveness</td>
<td>4</td>
<td>.70</td>
<td>.20</td>
<td>373</td>
<td>.83*</td>
</tr>
<tr>
<td>Resource Utilization and Development</td>
<td>6</td>
<td>.75</td>
<td>.16</td>
<td>340</td>
<td>.85*</td>
</tr>
<tr>
<td>Team Effectiveness</td>
<td>5</td>
<td>.81</td>
<td>.14</td>
<td>364</td>
<td>.88*</td>
</tr>
<tr>
<td>All Items (Total)</td>
<td>20</td>
<td>.78</td>
<td>.13</td>
<td>320</td>
<td>.95**</td>
</tr>
</tbody>
</table>

* Reliabilities based on N = 312 to 374
** Reliability based on N = 297
Examination of Table 7 indicates that compared to other Effectiveness scales, the Psychological Effectiveness scale had the lowest mean and the highest standard deviation. This suggests that subjects perceived lower levels of group member growth opportunities, trust and commitment to the organization, and job satisfaction, compared to other types of group effectiveness. Subjects also had lower levels of agreement when responding to Psychological Effectiveness scale items, than other Effectiveness scales.

Appendix N presents correlations between Effectiveness scales. Correlations were highest between the Team Effectiveness and Psychological Effectiveness scales, and between the Team Effectiveness and Resource Utilization and Development scales. This suggests that there is a high relationship (compared to relationships between other scales) between the internal processes of a team and the ability of the team to satisfy the psychological needs of team members, and the ability of teams to effectively utilize team resources and increase the efficiency of work processes.

Correlations Between Support Systems Scales, Empowerment Scales, and Effectiveness Scales

Appendix N presents correlations between the Support Systems Survey scales, Empowerment scales, and Effectiveness scales. Correlations between the Support Systems Survey Importance scales and Presence scales have previously been discussed. Examination of Appendix N indicates that correlations between the Support Systems Survey Importance scales and the Effectiveness scales were low (relative to correlations between other scales). This suggests that there is a low relationship between what subjects perceive as important organizational support and current levels of perceived
effectiveness. Further, correlations between the Support Systems Survey Presence scales and the Empowerment and Effectiveness scales were high (relative to correlations between other scales). This might be expected, given that subjects responded to these scales based on perceptions of their current work environment.

Additionally, correlations between the Group Design Presence scale and the Effectiveness and Empowerment scales were high (compared to correlations between other scales). This suggests that a high relationship exists between effective group design and perceived empowerment and effectiveness. Correlations were also high, compared to other correlations, between the Consequences scale and the Effectiveness scales. This suggests that groups performing customer associated tasks is related to group effectiveness.

Assumptions of Multivariate Statistics and Multivariate Outliers

All scale distributions have been assessed for normality using SPSS FREQUENCIES. Appendix N displays the skewness and kurtosis for each scale distribution. Homogeneity of variance-covariance matrices will be addressed by using epsilon to adjust alpha levels. All scales, except for total scales, were examined for multicollinearity and singularity. Correlations between scales are lower than .90. Squared multiple correlations ranged from .50 to .85 for all scales ("composite" scales--scale comprised of all items--were not included in the analysis).

Multivariate outliers were also examined using Mahalanobis distance and were computed using SPSS REGRESSION. To determine the overall pattern of responses, summed scores were used for each type of scale--Presence scales were summed into a
composite score and Importance scales were summed into a composite score. Total
Presence, Importance, Empowerment, and Perceptions of Team Performance scores were
independent variables; idnumber was used as a dependent variable (Tabachnick & Fidell,
1996). Mahalanobis distance scores indicated that seven individuals were multivariate
outliers, \( p < .001 \). These individuals were removed from the data set for subsequent
analyses. This reduced the available sample size from 407 to 400.

Using SPSS REGRESSION, normality, linearity, and homoscedasticity were
assessed by residual plots (Tabachnick & Fidell, 1996). Presence scales, Importance
scales, and Empowerment scales were used as independent variables; Total effectiveness
was used as the dependent variable. Plots of predicted values against residuals suggested
that the assumptions of normality, linearity, and homoscedasticity were met.

Theory Testing

This section presents analyses of the Support Systems Survey scales,
Empowerment Scales, and Perception of Team Performance scales. First, the relationship
between the Presence and Importance Support Systems Survey scales is studied. Then,
the relationship between the Support Systems Survey scales and the following are
examined: team tasks; single-functional or multi-functional teams; temporary or
permanent teams; low, medium, and high levels of perceived empowerment; low,
medium, and high levels of perceived effectiveness; team membership compared to
nonteam membership; stage of knowledge development; and manager role in relation to
teams. Multiple effective teams are also studied to see if the profile of support systems
can vary for teams with high levels of perceived effectiveness. Finally, linear models are
developed to determine how support systems and empowerment predict perceived effectiveness.

Note that the Support Systems Survey scales, the Empowerment Scales, and Perception of Team Performance scales are based on subjects' perceptions. For example, the Psychological Effectiveness scale could more clearly be described as the Perceived Psychological Effectiveness scale. To increase the readability of the following text, perceived is omitted from each of the scale labels. However, the reader should be aware that all of the scales are subjects perceptions of their work environment.

In the following analyses, simple effects ANOVAs were computed using SPSS MANOVA. For between groups analyses, contrasts were based on the degrees of freedom and error terms computed from simple effects analyses. Means, N, the error term, and degrees of freedom were entered by way of the SPSS MATRIX command and analyzed using SPSS ONEWAY. Within subjects contrasts (Importance versus Presence scales) were performed using SPSS MANOVA. For both contrast and simple effects analyses, significance were based on Scheffe adjustments. Scheffe adjustments are applicable to groups of different size, insensitive to deviations from normality and homogeneity of variance, and are one of the most versatile means of controlling for familywise error rates (Hays, 1986). All tables are "ordered" so that the Group Design scale is presented first, followed by the Defining Performance, Information, Direct Supervisor, Executive Manager, Training, Performance Appraisal, Rewards, and Integration scales.
Finally, there were insufficient numbers of nonteam subjects to adequately evaluate some hypotheses. In most instances, a sample size of 30 or more is considered sufficient when approximating a sample population (Hays, 1988). Analyses of the relationship between team tasks, single-functional or multi-functional teams, temporary or permanent teams, and the Support Systems Survey scales, resulted in cells with only one case ($n=1$). A similar situation occurred when examining the relationship between team members versus nonteam members and low or high levels of empowerment. In this case, the number for one cell was 11.

Support Systems Survey

To evaluate the hypothesis that performance definition and direct supervision support will be perceived as the most important organizational support (H1A & H1B), a repeated measures MANOVA was performed. The MANOVA design was 2 scale types (Importance and Presence) X 9 Support Systems Survey scales (Group Design, Defining Performance, Information, Direct Supervisor, Executive Manager, Training, Performance Appraisal, Rewards, and Training). Scale type and Support Systems Survey scales were the dependent variables (i.e., repeated measures MANOVA creates two variables, one for Scale type and one for the Support Systems Survey scales).

The analysis revealed main effects for scale type, $F(1, 335) = 344.38, p = .000$ and for Support Systems Survey scales, $F(8, 328) = 138.53, p = .000$, qualified by a scale type by Support Systems Survey scale interaction, $F(8, 328) = 34.28, p = .000$.

Contrasts on the scale type by Support Systems Survey scale interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996).
Contrasts indicated significant differences between each Presence scale and its Importance scale equivalent.

Further, Importance scales and then Presence scales were examined for significant differences between scales. Comparison of scales were performed in two ways: (1) the scales were ordered from highest to lowest according to Importance scale results (Group Design, Defining Performance, Information, Direct Supervision, Executive Manager, Training, Performance Appraisal, Rewards, and Integration), and adjacent scales (e.g., Group Design with Defining Performance, Defining Performance with Information, Information with Direct Supervision) were compared; and (2) each scale was compared to the scale with the highest mean (Group Design for both Importance and Presence scales). Comparisons were adjusted using the Scheffe procedure.

For Importance scales, comparison of adjacent scales indicated significant differences between the Group Design scale and the Defining Performance scale. No other comparisons were significant. However, for Importance scales, comparison of each scale to the Group Design scale revealed significant differences for each comparison. Thus, each scale was significantly different from the Group Design scale.

For Presence scales, comparison of adjacent scales revealed significant differences between the Group Design and Defining Performance scales, the Direct Supervision and Executive Manager scales, the Executive Manager and Training scales, the Performance Appraisal and Reward scales, and the Rewards and Integration scales. Further, for Presence scales, comparison of each scale to the Group Design scale revealed significant differences for each comparison, except for the Direct Supervision scale.
These results suggest that subjects perceived significant differences between the importance of organizational support for work groups and the presence of support in their work environment. This difference extended to each support systems scale. Further, employees viewed the types of support differentially, depending upon which type of scale (Presence or Importance) was examined. For Importance scales, each scale was significantly different from the Group Design scale. However, comparison of adjacent cells was significant only for the Group Design and Defining Performance comparison. For Presence scales, each scale was significantly different from the Group Design scale, except for the Direct Supervision scale. Comparison of adjacent scales was significant for the Group Design and Defining Performance comparison, and when the Executive Manager and Rewards scales were compared to adjacent scales.

Team Tasks and the Support Systems Survey

To evaluate the hypothesis that the perceived importance and presence of organizational support will vary as a function of team tasks (H2A), a repeated measures MANOVA was performed. The MANOVA design was 5 team tasks (production work, N = 62; information processing, N = 46; one-on-one service providers, N = 57; multiple service providers, N = 46; and product development, N = 125) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; team task was the between subjects factor.

The analysis revealed main effects for team task, F (36, 1280) = 1.80, p = .003, and scale type, F (9, 317) = 51.60, p = .000, qualified by a team task by scale type interaction, F (36, 1189.68) = 1.46, p = .041. Contrasts on the team task by scale type
interaction were adjusted using the Scheffé procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in production settings had significant differences between each Presence scale and its Importance scale counterpart; individuals in information processing settings had significant differences between the Group Design, Information, and Reward Presence scales and their Importance scale equivalent; individuals in one-on-one service provider settings perceived significant differences between the Group Design, Defining Performance, Executive Managers, Training, Reward, and Integration Presence scales and their Importance scale duplicate; individuals in multiple service provider settings had significant differences between the Information, Executive Manager, and Reward Presence scales and their Importance scale counterpart; and individuals in product development settings perceived significant differences between the Group Design, Defining Performance, Information, Direct Supervisor, Executive Manager, Performance Appraisal, Rewards, and Integration Presence scales and their Importance scale equivalent.

Simple effects for each scale type (Presence or Importance) were also examined. The Scheffé procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). Simple effects analyses for both Presence and Importance scales were nonsignificant.

These results suggest that each group had different patterns (i.e., the number and type of Presence scales that were significantly different from its Importance scale counterpart) in terms of differences between importance and presence of organizational support. However, there were no significant differences between the groups in terms of
how they perceived the importance of organizational support or how they perceived the
presence of organizational support. Thus, the hypothesis of significant differences
between team tasks in terms of organizational support, was not supported.

Single-Functional and Multi-Functional Teams and Support Systems Survey Scales

To evaluate the hypothesis that the perceived importance and presence of
organizational support will vary for single-functional compared to multi-functional teams
(H2B), a repeated measures MANOVA was performed. The MANOVA design was 2
team types (single-functional, N = 175; or multi-functional, N = 126) by 2 scale types
(Importance and Presence). Scale type was the within subjects factor; team type was the
between subjects factor.

The analysis revealed main effects for team type, $F(9, 285) = 2.64$, $p = .006$, and
scale type, $F(9, 285) = 58.42$, $p = .000$, qualified by a team type by scale type interaction,$F(9, 285) = 4.10$, $p = .000$. Contrasts on the team task by scale type interaction were
adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results
indicated that individuals in single-functional and multi-functional teams had significant
differences between each Presence scale and its Importance scale counterpart. Scheffe
adjusted contrasts between single-functional and multi-functional teams for each scale
type (Presence or Importance) were nonsignificant. These results suggest that no
significant differences exist between single-functional or multi-functional teams in terms
of how the importance or presence of organizational support is perceived. Thus, the
hypothesis of significant differences between single-functional and multi-functional
teams in terms of organizational support, was not supported.
Temporary or Permanent Teams and Support Systems Survey Scales

To evaluate the hypothesis that the perceived importance and presence of organizational support will vary as a function of temporary or permanent teams (H2C), a repeated measures MANOVA was performed. The MANOVA design was 3 team durations (a few months, N = 45; about a year, N = 50; and many years, N = 243) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; team duration was the between subjects factor.

The analysis revealed main effects for team duration, $F (18, 642) = 2.78, p = .000$, and scale type, $F (9, 321) = 39.11, p = .000$, qualified by a team duration by scale type interaction, $F (18, 642) = 2.06, p = .006$. Contrasts on the team duration by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in groups lasting only a few months had significant differences between the Group Design, Defining Performance, Information, Executive Manager, and Reward Presence scales and their Importance scale equivalent; individuals in groups lasting about a year had significant differences between the Group Design, Executive Manager, and Reward Presence scales and their Importance scale counterpart; and individuals in groups lasting many years had significant differences between each Presence scale and its Importance scale counterpart.

Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effect analyses were significant for Training. Contrasts on the Training scale for each level of team
duration were performed and adjusted using the Scheffe procedure. Contrasts indicated a significant difference between teams having durations of many years (mean = 55.00) and the other teams, including teams existing for a few months (mean = 50.11) and teams lasting about a year (mean = 50.12).

Table 8

Presence Scale Means By Team Duration

<table>
<thead>
<tr>
<th>Presence Scale</th>
<th>Means: Team Duration</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A Few Months</td>
<td>About a Year</td>
<td>Many Years</td>
</tr>
<tr>
<td>Group Design</td>
<td>48.96</td>
<td>48.74</td>
<td>51.91</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>47.26</td>
<td>46.28</td>
<td>49.88</td>
</tr>
<tr>
<td>Information</td>
<td>44.78</td>
<td>46.18</td>
<td>49.85</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>46.24</td>
<td>44.88</td>
<td>51.52</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>40.48</td>
<td>39.06</td>
<td>44.61</td>
</tr>
<tr>
<td>Training</td>
<td>43.41</td>
<td>42.18</td>
<td>47.32</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>41.70</td>
<td>41.04</td>
<td>46.24</td>
</tr>
<tr>
<td>Rewards</td>
<td>32.52</td>
<td>33.72</td>
<td>39.26</td>
</tr>
</tbody>
</table>

Table 8 presents Presence scales for each team duration. For Presence scales, simple effect analyses were significant for the Group Design, Information, Direct Supervisor, Executive Manager, Training, Performance Appraisal, and Rewards scales. For the Group Design and Training scales, groups having durations of many years had significantly higher means than teams with durations of only several months. For the Information, Direct Supervisor, Executive Manager, Performance Appraisal, and Rewards scales, teams with durations of many years, and teams existing for about one year, had significantly higher means than teams with durations of several months.
Results suggest that compared to shorter-length groups, individuals in groups lasting many years perceived greater differences in the importance and presence of organizational support in their work setting. Further, teams with longer durations also perceived higher levels of support in their work environments compared to teams with shorter durations. The hypothesis that individuals would perceive support systems differentially as a function of team duration, was partially supported.

The Relationship Between Empowerment and Organizational Support

To evaluate the hypothesis that the importance and presence of organizational support will vary as a function of high, medium, or low empowerment (H3A), each Empowerment scale (Potency, Meaningfulness, Consequences, Autonomy, and an Empowerment Composite scale), was divided into low, medium, and high groups. Divisions were based on percentages so that each division contained as close to 33% of the sample as the distribution allowed.

Thus, for the Potency scale, 29.3% (N = 117) of the sample was assigned to the low Potency group, 31.5% (N = 126) was assigned to the medium Potency group, and 30% (N = 120) was assigned to the high Potency group (9.3% of the sample were missing data points for the Potency scale). Analyses for each of the five scales are discussed below in detail.

Potency Scale

To evaluate the relationship between Potency and the Importance and Presence scales, a repeated measures MANOVA was performed. The MANOVA design was 3 levels of Potency (low, N = 62; medium, N = 62; and high, N = 62) by 2 scale types
(Importance and Presence). Scale type was the within subjects factor; Potency was the between subjects factor.

The analysis revealed main effects for the three levels of Potency, $F(18, 600) = 5.05, p = .000$, and scale type, $F(9, 300) = 60.24, p = .000$, qualified by a Potency by scale type interaction, $F(18, 600) = 2.51, p = .001$. Contrasts on the Potency by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the low and medium Potency groups had significant differences between each Importance scale and its Presence scale counterpart. Individuals in the high Potency group had significant differences between the Group Design, Defining Performance, Information, Executive Manager, Reward, and Integration Importance scales and their Presence scale equivalent.

Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effects analyses were significant for the Group Design and Defining Performance scales. For the Group Design scale, employees in the high Potency group (mean = 59.84) had a significantly higher mean compared to the medium (mean = 56.87) and low (mean = 55.51) Potency groups. Moreover, for the Defining Performance scale, individuals in the high Potency group (mean = 57.59) had a significantly higher mean compared to the medium (mean = 54.99) and low (mean = 53.75) Potency groups. Table 9 displays means for all Importance scales and the different levels of Potency.
Table 9

Importance Scale Means for Low, Medium, and High Levels of Potency

<table>
<thead>
<tr>
<th>Importance Scale</th>
<th>Means: Potency Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>55.51</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>53.75</td>
</tr>
<tr>
<td>Information</td>
<td>54.13</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>53.78</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>53.26</td>
</tr>
<tr>
<td>Training</td>
<td>51.79</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>51.01</td>
</tr>
<tr>
<td>Rewards</td>
<td>49.72</td>
</tr>
<tr>
<td>Integration</td>
<td>49.24</td>
</tr>
</tbody>
</table>

For Presence scales, simple effects were significant for the Group Design, Defining Performance, Information, Direct Supervisor, Executive Manager, Training, Performance Appraisal, and Integration scales. For the Group Design and Defining Performance scales, contrasts indicated that each Potency group (high, medium, and low) had significantly different means compared to each other Potency group. Additionally, individuals in the high Potency group had a significantly higher mean compared to medium and low Potency groups for the Information, Direct Supervisor, Executive Manager, Training, Performance Appraisal, and Integration scales. Table 10 displays means for all Presence scales and the different levels of Potency.

Results suggest that individuals in the high Potency group perceived fewer differences between the importance and presence of organizational support in their work.
environment. Compared to individuals in the low and medium Potency groups, individuals in the high Potency group also perceived the Group Design and Defining Performance scales as significantly more important.

Table 10

Presence Scale Means for Low, Medium, and High Levels of Potency

<table>
<thead>
<tr>
<th>Presence Scale</th>
<th>Means: Potency Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>46.14</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>44.18</td>
</tr>
<tr>
<td>Information</td>
<td>44.99</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>46.19</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>40.38</td>
</tr>
<tr>
<td>Training</td>
<td>42.54</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>40.81</td>
</tr>
<tr>
<td>Rewards</td>
<td>34.58</td>
</tr>
<tr>
<td>Integration</td>
<td>40.24</td>
</tr>
</tbody>
</table>

Finally, excluding the Rewards scale, subjects in the high Potency group reported significantly higher levels of support in their work environment compared to medium and low Potency groups. The hypothesis that individuals would perceive support systems differentially as a function of perceived Potency, was supported.

Autonomy Scale

To evaluate the hypothesis that perceived importance and presence of organizational support would vary as a function of high, medium, or low Autonomy, a repeated measures MANOVA was performed. The MANOVA design was 3 levels of
Autonomy (low, N = 99; medium, N = 107; and high N = 125) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; Autonomy was the between subjects factor.

The analysis revealed main effects for the three levels of Autonomy, \( F(18, 630) = 7.14, p = .000 \), and scale type, \( F(9, 315) = 65.13, p = .000 \), qualified by a Autonomy by scale type interaction, \( F(18, 630) = 3.58, p = .001 \). Contrasts on the Autonomy by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the low or high Autonomy groups had significant differences between each Importance scale and its Presence scale counterpart. Individuals in the medium Autonomy group had significant differences between each Importance scale and its Presence scale equivalent, except for the Direct Supervisor and Training scales.

Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effect analyses were significant for the Group Design, Defining Performance, Information, Direct Supervisor, Training, and Integration scales. For each scale, individuals in the high Autonomy group had significantly higher means than individuals in the medium and low Autonomy groups. Table 11 displays Importance scale means for the different levels (high, medium, or low) of Autonomy.

Further, simple effects analyses for each Presence scale were significant. Contrasts indicated that for each Presence scale except Rewards, each Autonomy group
(high, medium, or low) had significantly different means from each other Autonomy group. For the Rewards scale, individuals in the high Autonomy group had a significantly higher mean compared to individuals in the low Autonomy group. Table 12 displays means for each Presence scale and high, medium, and low levels of Autonomy.

Table 11

Importance Scale Means for Low, Medium, and High Levels of Autonomy

<table>
<thead>
<tr>
<th>Importance Scales</th>
<th>Means: Autonomy Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>55.97</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>53.81</td>
</tr>
<tr>
<td>Information</td>
<td>54.04</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>53.92</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>53.56</td>
</tr>
<tr>
<td>Training</td>
<td>52.72</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>50.82</td>
</tr>
<tr>
<td>Rewards</td>
<td>50.68</td>
</tr>
<tr>
<td>Integration</td>
<td>49.26</td>
</tr>
</tbody>
</table>

With the exception of the Direct Supervisor and Training scales for the medium Autonomy group, results indicate that each Autonomy group (high, medium, or low) had significant differences between the importance and presence of organizational support in their work environment.

Further, similar to results from Potency analyses, individuals in the high Autonomy group indicated that organizational support was more important than individuals in low and medium Autonomy groups. Finally, compared to low and medium
Autonomy groups, individuals in the high Autonomy group perceived a significantly higher presence of organizational support in their work environment. The hypothesis that individuals would perceive support systems differentially as a function of perceived Autonomy, was supported.

Table 12

Presence Scale Means for Low, Medium, and High Levels of Autonomy

<table>
<thead>
<tr>
<th>Presence Scales</th>
<th>Means: Autonomy Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>45.11</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>42.82</td>
</tr>
<tr>
<td>Information</td>
<td>43.13</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>45.04</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>38.74</td>
</tr>
<tr>
<td>Training</td>
<td>39.64</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>39.18</td>
</tr>
<tr>
<td>Reward</td>
<td>33.44</td>
</tr>
<tr>
<td>Integration</td>
<td>38.56</td>
</tr>
</tbody>
</table>

Meaningfulness Scale

To evaluate the hypothesis that the importance and presence of organizational support varies as a function of high, medium, or low Meaningfulness, a repeated measures MANOVA was performed. The MANOVA design was 3 levels of Meaningfulness (low, N = 97; medium, N = 117; and high, N = 116) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; Meaningfulness was the between subjects factor.
The analysis revealed main effects for the three levels of Meaningfulness, $F(18, 628) = 8.52$, $p = .000$, and scale type, $F(9, 314) = 60.63$, $p = .000$, qualified by a Meaningfulness by scale type interaction, $F(18, 628) = 3.13$, $p = .000$. Contrasts on the Meaningfulness by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the low and medium Meaningfulness groups had significant differences between each Importance scale compared to its Presence scale counterpart. Individuals in the high Meaningfulness group had significant differences between each Importance scale and its Presence scale equivalent, except for the Direct Supervisor scale.

Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effect analyses were significant for the Group Design, Defining Performance, Information, Direct Supervisor, Executive Manager, Training, and Integration scales. For all the above mentioned scales except Training and Integration, individuals in the high Meaningfulness group had significantly higher means than individuals in the medium and low Meaningfulness groups. For the Training and Integration scales, individuals in the high Meaningfulness group had significantly higher means then individuals in the low Meaningfulness group. Table 13 displays means for the Importance scales and different levels (high, medium, or low) of Meaningfulness.
Further, simple effects for all Presence scales, except the Rewards scale, were significant. Contrasts indicated that for the Group Design, Defining Performance, Training, and Integration scales, each Meaningfulness group (high, medium, or low) had significantly different means compared to each other Meaningfulness group. For the Performance Appraisal and Information scales, individuals in the low Meaningfulness group had significantly lower means than individuals in the medium and high Meaningfulness groups. For the Direct Supervisor and Executive Manager scales, individuals in the high Meaningfulness group had significantly higher means than individuals in the low and medium Meaningfulness groups. Table 14 displays means for each Presence scale as a function of high, medium, or low Meaningfulness.

<table>
<thead>
<tr>
<th>Importance Scales</th>
<th>Means: Meaningfulness Levels</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>55.29</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>53.72</td>
</tr>
<tr>
<td>Information</td>
<td>53.85</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>54.24</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>53.20</td>
</tr>
<tr>
<td>Training</td>
<td>51.72</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>50.80</td>
</tr>
<tr>
<td>Rewards</td>
<td>49.58</td>
</tr>
<tr>
<td>Integration</td>
<td>48.45</td>
</tr>
</tbody>
</table>

Table 13

Importance Scale Means for Low, Medium, and High Levels of Meaningfulness
Table 14

Presence Scale Means for Low, Medium, and High Levels of Meaningfulness

<table>
<thead>
<tr>
<th>Presence Scales</th>
<th>Means: Meaningfulness Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>45.64</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>43.21</td>
</tr>
<tr>
<td>Information</td>
<td>44.36</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>46.79</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>40.40</td>
</tr>
<tr>
<td>Training</td>
<td>41.70</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>39.76</td>
</tr>
<tr>
<td>Rewards</td>
<td>33.77</td>
</tr>
<tr>
<td>Integration</td>
<td>39.61</td>
</tr>
</tbody>
</table>

Results suggest that each Meaningfulness group (high, medium, or low) perceived significant differences between the importance and presence of organizational support in their work environment. Further, similar to results from Potency analyses, individuals in the high Meaningfulness group perceived organizational support as significantly more important than the low and medium Meaningfulness groups. Finally, compared to the medium and low Meaningfulness groups, individuals in the high Meaningfulness groups indicated a significantly greater presence of organizational support in their work environment. The hypothesis that individuals would perceive support systems differentially as a function of perceived Meaningfulness, was supported.
Consequences Scale

To evaluate the hypothesis that the importance and presence of organizational support varies as a function of high, medium, or low Consequences, a repeated measures MANOVA was performed. The MANOVA design was 3 levels of Consequences (low, N = 110; medium, N = 119; and high, N = 98) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; Consequences (high, medium, or low) was the between subjects factor.

The analysis revealed main effects for the three levels of Consequences, $F(18, 622) = 8.13, p = .000$, and scale type, $F(9, 311) = 60.81, p = .000$, qualified by a Consequences by scale type interaction, $F(18, 622) = 3.35, p = .000$. Contrasts on the Consequences by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the low and medium Consequences group had significant differences between each Importance scale and its Presence scale counterpart. Individuals in the high Consequences group had significant differences between each Importance scale and its Presence scale equivalent except for the Direct Supervisor, Training, and Performance Appraisal scales.

Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effects analyses were significant for the Group Design, Defining Performance, Information, Direct Supervisor, Training, Rewards, and Integration scales. For all the above mentioned scales except Rewards, individuals in the high Consequences group had significantly higher
means than individuals in the medium and low Consequences groups. For the Rewards scale, individuals in the high Consequences group had significantly higher means than individuals in the low Consequences group. Table 15 displays means for each Importance scale as a function of high, medium, or low Consequences.

Table 15

<table>
<thead>
<tr>
<th>Importance Scales</th>
<th>Means: Consequences Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>55.60</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>53.15</td>
</tr>
<tr>
<td>Information</td>
<td>53.46</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>53.72</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>52.88</td>
</tr>
<tr>
<td>Training</td>
<td>51.11</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>49.99</td>
</tr>
<tr>
<td>Rewards</td>
<td>48.42</td>
</tr>
<tr>
<td>Integration</td>
<td>48.07</td>
</tr>
</tbody>
</table>

Further, simple effects for all the Presence scales were significant. Contrasts indicated that for all scales except Rewards, each Consequences group (high, medium, or low) had significantly different means from each other Consequences group. For the Rewards scale, individuals in the medium and high Consequences group had significantly higher means than individuals in the low Consequences group. Table 16 displays means for all Presence scales and the different levels (high, medium, or low) of Consequences.
Table 16

Presence Scale Means for Low, Medium, and High Levels of Consequences

<table>
<thead>
<tr>
<th>Presence Scales</th>
<th>Means: Consequences Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>45.55</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>42.77</td>
</tr>
<tr>
<td>Information</td>
<td>43.49</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>45.42</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>38.70</td>
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<tr>
<td>Training</td>
<td>41.09</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>38.38</td>
</tr>
<tr>
<td>Rewards</td>
<td>32.40</td>
</tr>
<tr>
<td>Integration</td>
<td>39.32</td>
</tr>
</tbody>
</table>

Results suggest that each Consequences group (high, medium, or low) perceived significant differences between the importance and presence of organizational support in their work environment. The high Consequences group tended to perceive fewer significant differences than the medium and low Consequences groups. Further, similar to analyses of the Potency and Autonomy scales, individuals in the high Consequences group perceived organizational support as significantly more important than individuals in the low and medium Consequences groups. Individuals in the high Consequences group also perceived significantly higher levels of organizational support in their work environment compared to medium and low Consequences groups. The hypothesis that individuals would perceive support systems differentially as a function of perceived Consequences, was supported.
Empowerment Composite Scale

To evaluate the hypothesis that the importance and presence of organizational support varies as a function of high, medium, or low Empowerment Composite (the sum of all Empowerment survey items), a repeated measures MANOVA was performed. The MANOVA design was 3 levels of Empowerment Composite (low, N = 105; medium, N = 110; and high, N = 112) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; Empowerment Composite (high, medium, or low) was the between subjects factor.

The analysis revealed main effects for the three Empowerment Composite levels, \( F(18, 622) = 10.79, p = .000 \), and scale type, \( F(9, 311) = 60.16, p = .000 \), qualified by a Empowerment Composite by scale type interaction, \( F(18, 622) = 3.85, p = .000 \). Contrasts on the Empowerment Composite by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the low and medium Empowerment Composite groups had significant differences between each Importance scale and its Presence scale counterpart. Individuals in the high Empowerment Composite group had significant differences between each Importance scale and its Presence scale equivalent, except for the Direct Supervisor and Performance Appraisal scales.

Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effect analyses were significant for the Group Design, Defining Performance, Information, Direct
Supervisor, Training, and Integration scales. Table 17 displays means for each Importance scales as a function of high, medium, or low Composite Empowerment. For the Group Design and Defining Performance scales, each Empowerment Composite group (high, medium, or low) had significantly different means compared to each other Empowerment Composite group.

Table 17

Importance Scale Means for Low, Medium, and High Levels of Composite Empowerment

<table>
<thead>
<tr>
<th>Importance Scales</th>
<th>Means: Composite Empowerment Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>54.51</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>52.51</td>
</tr>
<tr>
<td>Information</td>
<td>52.93</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>52.96</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>52.38</td>
</tr>
<tr>
<td>Training</td>
<td>50.92</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>50.01</td>
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<tr>
<td>Rewards</td>
<td>48.83</td>
</tr>
<tr>
<td>Integration</td>
<td>47.80</td>
</tr>
</tbody>
</table>

Further, for the Information and Integration scales, individuals in the medium and high Empowerment Composite groups had significantly higher means than individuals in the low Empowerment Composite group. For the Direct Supervisor and Training scales, individuals in the high Empowerment Composite group had significantly higher means than individuals in the low Empowerment Composite group.
Further, simple effects for each Presence scale were significant. Contrasts indicated that for all scales except Rewards, each Empowerment Composite group (high, medium, or low) had significantly different means compared to each other Empowerment Composite group. For Rewards, individuals in the high and medium Empowerment Composite groups had significantly higher means than individuals in the low Empowerment Composite group. Table 18 displays means for all Presence scales and the different Empowerment Composite levels (high, medium, or low).

Table 18

Presence Scale Means for Low, Medium, and High Levels of Composite Empowerment

<table>
<thead>
<tr>
<th>Presence Scales</th>
<th>Means: Composite Empowerment Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>44.73</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>41.91</td>
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<tr>
<td>Information</td>
<td>43.12</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>44.46</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>38.61</td>
</tr>
<tr>
<td>Training</td>
<td>40.05</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>38.50</td>
</tr>
<tr>
<td>Rewards</td>
<td>32.71</td>
</tr>
<tr>
<td>Integration</td>
<td>38.53</td>
</tr>
</tbody>
</table>

Results suggest that each Empowerment Composite group (high, medium, or low) perceived significant differences between the importance and presence of organizational support in their work environment. Individuals in the high Empowerment Composite
group had no significant differences between the Direct Supervisor and Performance Appraisal Presence scales and their Importance scale counterparts.

Further, excluding the Executive Manager, Performance Appraisal, and Reward scales, individuals in the high Empowerment Composite group perceived organizational support as significantly more important than individuals in the low Empowerment Composite groups. Except for the Rewards scale, individuals in the high Empowerment Composite group also perceived a significantly higher presence of organizational support in their work environment compared to medium and low Empowerment Composite groups.

Thus, results for the hypothesis that individuals would perceive support systems differentially as a function of perceived Composite Empowerment, was supported. There appears to be a relationship between perceived organizational support and perceived level of empowerment.

The Relationship Between Effectiveness and Organizational Support

To evaluate the relationship between effectiveness and perceived organizational support, each Perception of Team Performance Scale (Customer Satisfaction, Psychological Effectiveness, Team Effectiveness, Resource Utilization and Development Effectiveness, and Composite Effectiveness) was divided into low, medium, and high levels (H7A). Divisions were based on percentages so that each level contained approximately 33.3% of sample. Thus, for the Customer Satisfaction scale, 30.3% (N = 121) of the sample was assigned to the low Customer Satisfaction group, 29.0% (N = 116) was assigned to the medium Customer Satisfaction group, and 29.8% (N = 119)
was assigned to the high Customer Satisfaction group (11% of the sample had no data points for the Customer Satisfaction scale). Analyses for the five scales are discussed below.

**Customer Satisfaction**

To evaluate the hypothesis that the perceived importance and presence of organizational support varies as a function of high, medium, and low Customer Satisfaction, a repeated measures MANOVA was performed. The MANOVA design was 3 levels of Customer Satisfaction (low, N = 107; medium, N = 112; and high, N = 105) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; Customer Satisfaction (high, medium, or low) was the between subjects factor.

The analysis revealed main effects for the three levels of Customer Satisfaction, $F(18, 598) = 2.18, p = .003$, and scale type, $F(9, 299) = 60.10, p = .000$, qualified by a Customer Satisfaction by scale type interaction, $F(18, 598) = 3.85, p = .000$. Contrasts on the Customer Satisfaction by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the low and medium Customer Satisfaction groups had significant differences between each Importance scale and its Presence scale counterpart. Individuals in the high Customer Satisfaction group had significant differences between each Importance scale and its Presence scale equivalent, except for the Direct Supervisor, Training, and Performance Appraisal scales. This pattern is similar to analyses of the Empowerment scales.
Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effects analyses were insignificant. Thus, there were no significant differences in terms of perceived importance of organizational support as a function of high, medium, or low Customer Satisfaction.

However, simple effects for all Presence scales were significant. Contrasts indicated that for the Group Design, Defining Performance, and Information scales, each Customer Satisfaction group (high, medium, or low) had significantly different means compared to each other Customer Satisfaction group. For the Direct Supervisor, Executive Manager, Training, and Performance Appraisal groups, individuals in the medium and high Customer Satisfaction group had significantly higher means than individuals in the low Customer Satisfaction group. For Rewards, individuals in the high Customer Satisfaction group had significantly higher means than individuals in the low Customer Satisfaction group. Finally, for Integration, individuals in the high Customer Satisfaction group had significantly higher means than individuals in the medium and low Customer Satisfaction group. Table 19 displays means for each significant Presence scales and the different levels (high, medium, or low) of Customer Satisfaction.

Results suggest that compared to individuals in the low and medium Customer Satisfaction groups, individuals in the high Customer Satisfaction group tend to perceive fewer discrepancies between the importance of organizational support and the presence of organizational support in their work environment.
Table 19

Presence Scale Means for Low, Medium, and High Levels of Customer Satisfaction

<table>
<thead>
<tr>
<th>Presence Scales</th>
<th>Means: Customer Satisfaction Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>47.36</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>44.91</td>
</tr>
<tr>
<td>Information</td>
<td>45.06</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>46.03</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>40.09</td>
</tr>
<tr>
<td>Training</td>
<td>42.33</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>40.00</td>
</tr>
<tr>
<td>Rewards</td>
<td>33.94</td>
</tr>
<tr>
<td>Integration</td>
<td>40.83</td>
</tr>
</tbody>
</table>

Further, regardless of low, medium, or high Customer Satisfaction, perceived importance of organizational support was the same. Finally, individuals in the high Customer Satisfaction group tended to perceive higher presence of organizational support for work groups in their work environment. The hypothesis that individuals would perceive support systems differentially as a function of perceived Customer Satisfaction, was partially supported.

Psychological Effectiveness

To evaluate the hypothesis that the importance and presence of organizational support varies as a function of high, medium, or low Psychological Effectiveness, a repeated measures MANOVA was performed. The MANOVA design was 3 levels of Psychological Effectiveness (low, $N = 101$; medium, $N = 112$; and high, $N = 112$) by 2
scale types (Importance and Presence). Scale type was the within subjects factor; Psychological Effectiveness (high, medium, or low) was the between subjects factor.

The analysis revealed main effects for the three levels of Psychological Effectiveness, $F (18, 618) = 6.58, p = .000$, and scale type, $F (9, 309) = 64.55, p = .000$, qualified by a Psychological Effectiveness by scale type interaction, $F (18, 618) = 2.98, p = .000$. Contrasts on the Psychological Effectiveness by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the low and medium Psychological Effectiveness groups had significant differences between each Importance scale and its Presence scale counterpart. Individuals in the high Psychological Effectiveness group had significant differences between each Importance scale and its Presence scale equivalent, except for the Direct Supervisor, Training, Performance Appraisal, and Integration scales.

Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effects analyses were significant for the Group Design, Defining Performance, Information, Direct Supervisor, Training, and Integration scales. Contrasts indicated that for the Group Design scale, each Psychological Effectiveness group (high, medium, or low) had significantly different means compared to each other Psychological Effectiveness group. For the Defining Performance, Information, and Direct Supervisor scales, individuals in the high Psychological Effectiveness group had significantly higher means than individuals in the medium and low Psychological Effectiveness groups. For the Training
scale, individuals in the high Psychological Effectiveness group had significantly higher means than individuals in the low Psychological Effectiveness group. Finally, for the Integration scale, individuals in the medium and high Psychological Effectiveness groups had significantly higher means than individuals in the low Psychological Effectiveness group. Table 20 displays means for each Importance scale and the different levels (high, medium, or low) of Psychological Effectiveness.

Table 20

Importance Scale Means for Low, Medium, and High Levels of Psychological Effectiveness

<table>
<thead>
<tr>
<th>Importance Scales</th>
<th>Means: Psychological Effectiveness Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>55.28</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>53.48</td>
</tr>
<tr>
<td>Information</td>
<td>52.86</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>53.44</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>52.20</td>
</tr>
<tr>
<td>Training</td>
<td>50.90</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>49.68</td>
</tr>
<tr>
<td>Rewards</td>
<td>49.14</td>
</tr>
<tr>
<td>Integration</td>
<td>47.90</td>
</tr>
</tbody>
</table>

Simple effects analyses on Presence scales indicated significant differences for each scale. Contrasts indicated that for all scales, each Psychological Effectiveness group (high, medium, or low) had significantly different means compared to each other
Psychological Effectiveness group. Table 21 displays means for each Presence scale and the different levels (high, medium, or low) of Psychological Effectiveness.

Table 21

Presence Scale Means for Low, Medium, and High Levels of Psychological Effectiveness

<table>
<thead>
<tr>
<th>Presence Scales</th>
<th>Means: Psychological Effectiveness Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>46.43</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>43.39</td>
</tr>
<tr>
<td>Information</td>
<td>43.17</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>44.35</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>37.56</td>
</tr>
<tr>
<td>Training</td>
<td>40.39</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>39.02</td>
</tr>
<tr>
<td>Rewards</td>
<td>31.85</td>
</tr>
<tr>
<td>Integration</td>
<td>39.29</td>
</tr>
</tbody>
</table>

Results are similar to analyses of the Customer Satisfaction scales. Compared to individuals in the low and medium Psychological Effectiveness groups, individuals in the high Psychological Effectiveness group perceived fewer discrepancies between the importance of organizational support and the presence of organizational support in their work environment. Further, with the exception of the Performance Appraisal and Rewards scales, individuals in the high Psychological Effectiveness group tended to perceive organizational support for work groups as more important than low Psychological Effectiveness groups. Finally, compared to low and medium Psychological Effectiveness groups, individuals in the high Psychological Effectiveness group indicated
a significantly higher presence of organizational support for teams in their work environment. The hypothesis that individuals would perceive support systems differentially as a function of perceived Psychological Effectiveness, was partially supported.

**Team Effectiveness**

To evaluate the hypothesis that the perceived importance and presence of organizational support varies as a function of high, medium, or low Team Effectiveness, a repeated measures MANOVA was performed. The MANOVA design was 3 levels of Team Effectiveness (low, \(N = 113\); medium, \(N = 105\); and high, \(N = 102\)) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; Team Effectiveness (high, medium, or low) was the between subjects factor.

The analysis revealed main effects for the three levels of Team Effectiveness, \(F(18, 608) = 5.98, p = .000\), and scale type, \(F(9, 304) = 60.47, p = .000\), qualified by a Team Effectiveness by scale type interaction, \(F(18, 608) = 3.52, p = .000\). Contrasts on the Team Effectiveness by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the low and medium Team Effectiveness groups had significant differences between each Importance scale and its Presence scale equivalent. Individuals in the high Team Effectiveness group had significant differences between the Group Design, Executive Manager, and Reward Importance scales and their Presence scale equivalent.

Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates.
(Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effects analyses were significant for the Group Design and Defining Performance scales. Contrasts indicated that for the Group Design scale, individuals in the medium and high Team Effectiveness groups has significantly higher means than individuals in the low Team Effectiveness group. For Defining Performance, individuals in the high Team Effectiveness group had significantly higher means than individuals in the low Team Effectiveness groups. Table 22 displays means for each Importance scale and the different levels (high, medium, or low) of Team Effectiveness.

Table 22

<table>
<thead>
<tr>
<th>Importance Scales</th>
<th>Means: Team Effectiveness Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>55.35</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>53.97</td>
</tr>
<tr>
<td>Information</td>
<td>54.26</td>
</tr>
<tr>
<td>Direct Supervision</td>
<td>53.75</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>53.56</td>
</tr>
<tr>
<td>Training</td>
<td>51.96</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>50.93</td>
</tr>
<tr>
<td>Rewards</td>
<td>50.04</td>
</tr>
<tr>
<td>Integration</td>
<td>49.20</td>
</tr>
</tbody>
</table>

Simple effects analyses on Presence scales indicated significant differences for each scale. Contrasts indicated that for the Group Design, Defining Performance, Information, Executive Manager, and Integration scales, each level of Team Effectiveness
(high, medium, or low) had significantly different means compared to each other Team Effectiveness level. For the Direct Supervisor, Training, and Performance Appraisal scales, individuals in the medium and high Team Effectiveness groups had significantly higher means than individuals in the low Team Effectiveness group. For Rewards, individuals in the high Team Effectiveness group had significantly higher means than individuals in the low Team Effectiveness group. Table 23 displays means for each Presence scale and the different levels (high, medium, or low) of Team Effectiveness.

Table 23

**Presence Scale Means for Low, Medium, and High Levels of Team Effectiveness**

<table>
<thead>
<tr>
<th>Presence Scales</th>
<th>Means: Team Effectiveness Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>46.06</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>43.92</td>
</tr>
<tr>
<td>Information</td>
<td>44.33</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>44.96</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>39.30</td>
</tr>
<tr>
<td>Training</td>
<td>42.13</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>39.85</td>
</tr>
<tr>
<td>Rewards</td>
<td>33.98</td>
</tr>
<tr>
<td>Integration</td>
<td>39.76</td>
</tr>
</tbody>
</table>

Similar to analyses of the Customer Satisfaction and Psychological Effectiveness scales, individuals in the high Team Effectiveness group tended to perceive fewer discrepancies between the importance of organizational support and the presence of organizational support in their work environment. In contrast, individuals in the low and
medium Psychological Effectiveness groups had significantly higher means for each Importance scale compared to its Presence scale counterpart. Further, compared to low and medium Psychological Effectiveness groups, individuals in the high Team Effectiveness group had higher means for the Group Design and Defining Performance Importance scales, and tended to perceive significantly higher levels of organizational support in their work environment. The hypothesis that individuals would perceive support systems differentially as a function of perceived Team Effectiveness, was partially supported.

Resource Utilization and Development Effectiveness

To evaluate the hypothesis that the perceived importance and presence of organizational support varies as a function of high, medium, or low Resource and Developmental Effectiveness, a repeated measures MANOVA was performed. The MANOVA design was 3 levels of Resource and Developmental Effectiveness (low, N = 100; medium, N = 106; and high, N = 100) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; Resource and Developmental Effectiveness (high, medium, or low) was the between subjects factor.

The analysis revealed main effects for the three levels of Resource and Developmental Effectiveness, \( F(18, 582) = 4.54, p = .000 \), and scale type, \( F(9, 291) = 60.19, p = .000 \), qualified by a Resource and Developmental Effectiveness by scale type interaction, \( F(18, 582) = 4.09, p = .000 \). Contrasts on the Resource and Developmental Effectiveness by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the low and
medium Resource and Developmental Effectiveness groups had significant differences between each Importance scale and its Presence scale counterpart. However, individuals in the high Resource and Developmental Effectiveness group had significant differences between the Group Design, Information, Executive Manager, and Reward Importance scales and their Presence scale equivalents.

Simple effects for each type of scale (Importance or Presence) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effect analyses were nonsignificant. These results suggest no significant differences in terms of how the different Resource and Developmental Effectiveness groups perceived the importance of organizational support.

However, simple effects analyses for Presence scales were significant for each scale. Contrasts indicated that for the Group Design, Defining Performance, Information, Training, Performance Appraisal, and Integration scales, each Resource and Developmental Effectiveness group (high, medium, or low) had significantly different means compared to each other Resource and Developmental Effectiveness group. For the Direct Supervisor, Executive Manager, and Rewards scales, individuals in the medium and high Resource and Developmental Effectiveness groups had significantly higher means than individuals in the low Resource and Developmental Effectiveness group. Table 24 displays means for each Presence scale and the different levels (high, medium, or low) of Resource and Developmental Effectiveness.
Table 24

Presence Scale Means for Low, Medium, and High Levels of Resource and Developmental Effectiveness

<table>
<thead>
<tr>
<th>Presence Scales</th>
<th>Means: Resource Utilization and Development Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>46.36</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>43.62</td>
</tr>
<tr>
<td>Information</td>
<td>43.80</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>44.97</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>39.33</td>
</tr>
<tr>
<td>Training</td>
<td>41.25</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>38.38</td>
</tr>
<tr>
<td>Rewards</td>
<td>32.40</td>
</tr>
<tr>
<td>Integration</td>
<td>39.73</td>
</tr>
</tbody>
</table>

Results from these analyses suggest that individuals in the high Resource and Developmental Effectiveness group perceived fewer discrepancies between the importance of organizational support and the presence of organizational support in their work environment. In contrast, individuals in the low and medium Psychological Effectiveness groups had significantly higher means for each Importance scale compared to its Presence scale counterpart.

Further, low, medium, and high levels of Resource and Developmental Effectiveness was not a factor in terms of distinguishing the importance of organizational support for teams. However, compared to individuals in the low Resource and Developmental Effectiveness group, individuals in the high Resource and Developmental
Effectiveness group indicated a significantly higher presence of organizational support for teams in their work setting. The hypothesis that individuals would perceive support systems differentially as a function of perceived Resource Utilization and Development, was partially supported.

**Composite Effectiveness**

To evaluate the hypothesis that the perceived importance and presence of organizational support varies as a function of high, medium, or low Composite Effectiveness (i.e., the sum of all Effectiveness scale items), a repeated measures MANOVA was performed. The MANOVA design was 3 levels of Composite Effectiveness (low, N = 98; medium, N = 95; and high, N = 98) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; Composite Effectiveness (high, medium, or low) was the between subjects factor.

The analysis revealed main effects for the three levels of Composite Effectiveness, \( F(18, 554) = 5.15, p = .000 \), and scale type, \( F(9, 277) = 60.47, p = .000 \), qualified by a Composite Effectiveness by scale type interaction, \( F(18, 554) = 3.86, p = .000 \). Contrasts on the Composite Effectiveness by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the low and medium Composite Effectiveness groups had significant differences between each Importance group and its Presence scale counterpart. However, individuals in the high Composite Effectiveness group had significant differences between the Executive Manager and Reward Importance scales and their Presence scale counterparts.
Table 25 displays means for each Presence scale and the different levels (high, medium, or low) of Composite Effectiveness. Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996).

**Table 25**

**Importance Scale Means for Low, Medium, and High Levels of Resource and Developmental Effectiveness**

<table>
<thead>
<tr>
<th>Importance Scales</th>
<th>Means: Composite Effectiveness Level</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Design</td>
<td></td>
<td>55.69</td>
<td>57.76</td>
<td>59.44</td>
</tr>
<tr>
<td>Defining Performance</td>
<td></td>
<td>53.56</td>
<td>55.80</td>
<td>57.63</td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td>53.48</td>
<td>55.34</td>
<td>57.11</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td></td>
<td>53.20</td>
<td>55.42</td>
<td>56.94</td>
</tr>
<tr>
<td>Executive Manager</td>
<td></td>
<td>53.24</td>
<td>53.61</td>
<td>54.60</td>
</tr>
<tr>
<td>Training</td>
<td></td>
<td>50.80</td>
<td>54.06</td>
<td>55.71</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td></td>
<td>50.14</td>
<td>51.52</td>
<td>53.52</td>
</tr>
<tr>
<td>Rewards</td>
<td></td>
<td>49.48</td>
<td>50.20</td>
<td>53.21</td>
</tr>
<tr>
<td>Integration</td>
<td></td>
<td>48.15</td>
<td>50.47</td>
<td>51.99</td>
</tr>
</tbody>
</table>

Further, for Importance scales, simple effects analyses were significant for the Group Design, Defining Performance, Information, Direct Supervisor, Training, and Integration scales. For the Group Design, Defining Performance, Information, Direct Supervisor, and Integration scales, individuals in the high Composite Effectiveness group had significantly higher means than individuals in the low Composite Effectiveness group. For Training, individuals in the medium and high Composite Effectiveness group
had significantly higher means than individuals in the low Composite Effectiveness group.

Simple effects analyses for Presence scales produced significant differences for each scale. Contrasts indicated significantly different means for each Composite Effectiveness group (high, medium, or low) compared to each other Composite Effectiveness group for all Presence scales. Table 26 displays means for each Presence scale and the different levels (high, medium, or low) of Composite Effectiveness.

Table 26

<table>
<thead>
<tr>
<th>Presence Scales</th>
<th>Means: Composite Effectiveness Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Group Design</td>
<td>45.97</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>43.39</td>
</tr>
<tr>
<td>Information</td>
<td>43.43</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>44.58</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>39.63</td>
</tr>
<tr>
<td>Training</td>
<td>41.45</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>39.50</td>
</tr>
<tr>
<td>Rewards</td>
<td>32.66</td>
</tr>
<tr>
<td>Integration</td>
<td>39.09</td>
</tr>
</tbody>
</table>

Results mirror those of the other effectiveness scales: individuals in the high Composite Effectiveness group perceived fewer discrepancies between the importance of organizational support and the presence of organizational support in their work environment. Except for the Performance Appraisal and Rewards scales, individuals in
the high Composite Effectiveness viewed organizational support for groups as more important than individuals in the low Composite Effectiveness group. Finally, individuals in the high Composite Effectiveness group indicated significantly higher levels of support system presence compared to either low or medium Composite Effectiveness groups. The hypothesis that individuals would perceive support systems differentially as a function of perceived effectiveness, was partially supported.

Team or Nonteam Member and Support Systems Survey Scales

To evaluate the hypothesis that the importance and presence of organizational support varies for team members compared to nonteam members (H4A), subjects were asked to rate their team or nonteam status in three ways: (1) an organizational definition; (2) an individual definition; and (3) a criteria-based definition. For the organizational definition, each subject rated whether their organization considered the individual to work on a team. For the individual definition, subjects were asked if they considered themselves to work on a team. The criteria-based decision was established on three standards: (1) the subject's work group had high amounts of decision-making authority (versus low amounts of decision-making); group rewards were based on group performance (versus rewards based on individual performance); and jobs were broadly defined (versus narrowly defined jobs).

Each method of assessing team or nonteam membership were used as independent variables and the Support Systems Survey scales were used as dependent variables. The relationship between support systems and the organizational, individual, and criteria-based definitions of teams or nonteam membership is discussed below.
Organizational Definition

To evaluate the relationship between team or nonteam membership (organizational definition) and Importance and Presence scales, a repeated measures MANOVA was performed. The MANOVA design was 2 membership types (team, N = 307; or nonteam, N = 25) by 2 scale types (Importance and Presence). Scale type was the within subjects factor; membership (team or nonteam) was the between subjects factor.

The analysis revealed a nonsignificant main effect for membership (team or nonteam) type, $F(9, 317) = 1.70, p = .088$, and a significant main effect for scale type, $F(9, 317) = 18.20, p = .000$. The membership type by scale type interaction was nonsignificant, $F(9, 317) = 0.400, p = .935$. The scale type main effect has been explored under analyses of the Support Systems Survey.

When the organizational definition of team membership (if the organization considers the individual to work on a team) was used, results suggest that no significant differences exist in terms of team versus nonteam membership and the perception of organizational support for teams. However, sample size for the nonteam cell (N = 25) may have been too small to adequately test for significant results (Hays, 1988).

Individual Definition

To evaluate the relationship between team or nonteam membership (individual definition) and Importance and Presence scales, a repeated measures MANOVA was performed. The MANOVA design was 2 membership types (team, N = 296; or nonteam, N = 35) by 2 scale types (Importance and Presence). Scale Type was the within subjects factor; membership (team or nonteam) was the between subjects factor.
The analysis revealed a nonsignificant main effect for membership type, $F(9, 316) = 1.78, p = .070$, and a significant main effect for scale type, $F(9, 316) = 28.22, p = .000$. The membership type by scale type interaction was nonsignificant, $F(9, 316) = 1.11, p = .335$. The scale type main effect has been explored under analyses of the Support Systems Survey.

When the individual definition of team membership (if the individual considers him or herself to work on a team) was used, results suggest that no significant differences exist in terms of team versus nonteam membership and the perception of organizational support for work groups. Sample size for the nonteam cell was $N = 35$.

Criteria-Based Definition

To evaluate the relationship between team or nonteam membership (criteria-based definition) and Importance and Presence scales, a repeated measures MANOVA was performed. The MANOVA design was 2 membership types (team, $N = 240$; or nonteam, $N = 59$) by 2 scale types (Importance and Presence). Scale Type was the within subjects factor; membership (team or nonteam) was the between subjects factor.

The analysis revealed significant main effects for membership type, $F(9, 287) = 4.115, p = .000$, and scale type, $F(9, 287) = 50.90, p = .000$, qualified by a membership (team versus nonteam) by scale type interaction, $F(9, 287) = 4.85, p = .000$. Contrasts on the membership (team versus nonteam) by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that both team and nonteam members had significant differences between each Importance group and its Presence scale counterpart.
Simple effects for each type of scale (Presence or Importance) were also examined. Contrasts were adjusted using the Scheffe procedure. For Importance scales, all contrasts were nonsignificant. Thus, Importance scale contrasts based on the criteria-based definition of team membership produced no significant differences between team and nonteam members. For Presence scales, simple effect analyses were significant for the Group Design scale. For the Group Design scale, team members had a significantly higher mean (mean = 52.48) compared to nonteam members (mean = 45.82).

Results suggest that the criteria-based definition of team or nonteam membership produced the highest F ratios compared to other definitions. Team members and nonteam members had similar perceptions in terms of discrepancies between the importance of organizational support and the presence of organizational support in their work environment. Further, team and nonteam members perceived the importance of organization similarly. However, team members perceived a significantly higher presence of group design in their work environment compared to nonteam members. The hypothesis that individuals would perceive support systems differentially as a function of perceived team membership, was marginally supported.

Knowledge Development and Support Systems Surveys

To evaluate the hypothesis that the perceived importance and presence of organizational support varies as a function of knowledge development stage (H6A), a repeated measures MANOVA was performed. The MANOVA design was 4 levels of knowledge development (discovery, N = 17; exploration, N = 37; testing, N = 15; and implementation, N = 62) by 2 scale types (Importance and Presence). Scale type was the
within subjects factor; knowledge development was the between subjects factor. Note that cell numbers were low for the discovery ($N = 17$) and testing ($N = 15$) groups. Thus the following results should be approached cautiously.

The analysis revealed nonsignificant main effects for knowledge development, $F(27, 345) = 1.07, p = 0.372$, and a significant main effect for scale type, $F(9, 118) = 60.47, p = .000$, qualified by a knowledge development by scale type interaction, $F(27, 345) = 1.66, p = .022$. Contrasts on the Composite Effectiveness by scale type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that individuals in the discovery and testing knowledge groups had no significant differences between each Importance group and its Presence scale counterpart. Individuals in the exploration group had significant differences between each Presence scale and its Importance scale equivalent except for the Direct Supervisor and Training scales. Individuals in the implementation group had significant differences between the Executive Manager and Reward Importance scales and their Presence scale counterparts.

Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). Simple effects for both Importance and Presence scales were nonsignificant.

Results suggest that individuals in the exploration and implementation groups perceived more significant differences between Importance scales and their Presence scale equivalents compared to the discovery and testing groups. However, these results are most likely due to the low numbers of individuals in the discovery and testing groups.
Low cell numbers decreased the probability of rejecting the null hypothesis (Hays, 1998). Finally, there were no significant differences between knowledge development groups and perceived importance of organizational support or perceived presence of organizational support. The hypothesis that individuals would perceive support systems differentially as a function of knowledge development stage, was not supported.

Supervisor Style and Support Systems Survey Scales

To evaluate the hypothesis that the perceived importance and presence of organizational support varies as a function of team supervision style (H8A), a repeated measures MANOVA was performed. The MANOVA design was 4 supervision styles (an (1) autocratic style—makes decisions, sets goals and gives job assignments, N = 21; a (2) participative style—gets employee input about decisions, goals, and job assignments, but makes final decisions, N = 57; a (3) collaborative style—gets input about decisions, goals, and job assignments and makes final decisions with employees, N = 145; and an (4) empowering style—allows employees to make decision, set goals, and make job assignments, N = 115) X 2 scale types (Presence and Importance scales). Scale type was the within subjects factor; supervision style (autocratic, participative, collaborative, or empowering) was the between subjects factor. Note there were few subjects in the autocratic supervision style group (N = 21). Thus, the following results should be approached cautiously.

The analysis revealed main effects for suppression style, $F(27, 935) = 2.67, p = .000$, and scale type, $F(9, 320) = 42.22, p = .000$, qualified by a supervision style by scale type interaction, $F(27, 935) = 2.65, p = .000$. Contrasts on the supervision style by scale
type interaction were adjusted using the Scheffe procedure (Hays, 1988; Tabachnick & Fidell, 1996). Results indicated that the autocratic supervision style group had significant differences between the Direct Supervision Importance scale and its Presence scale equivalent. The collaborative supervision style, however, had significant differences between each Importance scale and its Presence scale counterpart. The participative and empowerment supervision style groups had significant differences between each Importance scale and its Presence scale equivalent except for the Training scale. Note that the low number of significant differences for the autocratic supervision style group could be due to the low power associated with a small N size (Hays, 1988).

Simple effects for each type of scale (Presence or Importance) were also examined. The Scheffe procedure was used to adjust for familywise significance rates (Hays, 1988; Tabachnick & Fidell, 1996). For Importance scales, simple effects analyses were nonsignificant. Thus, results suggest that each group (autocratic, participative, collaborative, or empowering) views the importance of organizational support for groups similarly.

Table 27 displays means for each Presence scale and the different levels of supervisor style. Simple effects analyses for Presence scales indicated significant differences for the Group Design, Defining Performance, Direct Supervision, Training, Performance Appraisal, and Integration scales. Contrasts were adjusted using the Scheffe procedure.

Contrasts indicated that for the Group Design, Direct Supervisor, Training, and Performance Appraisal scales, individuals in the collaborative and empowering
supervision style groups had significantly higher means than individuals in the autocratic and participative supervision style groups.

Table 27

Presence Scale Means for Autocratic, Participative, Collaborative, and Empowering Supervision Style

<table>
<thead>
<tr>
<th>Presence Scales</th>
<th>Mean: Supervision Style</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Autocratic</td>
</tr>
<tr>
<td>Group Design</td>
<td>46.15</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>44.40</td>
</tr>
<tr>
<td>Information</td>
<td>43.85</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>42.05</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>40.50</td>
</tr>
<tr>
<td>Training</td>
<td>39.35</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>38.05</td>
</tr>
<tr>
<td>Rewards</td>
<td>33.85</td>
</tr>
<tr>
<td>Integration</td>
<td>39.25</td>
</tr>
</tbody>
</table>

Further, for the Defining Performance scale, individuals in the empowering supervision style group had significantly higher means than individuals in the autocratic supervision style group, and individuals in the collaborative and empowering supervision style groups had significantly higher means than individuals in the participative supervision style group. Finally, for the Integration scale, individuals in the empowering supervision style group had significantly higher means than individuals in the autocratic and participative supervision style groups.
Except for the autocratic supervision style group, results suggest that all groups (autocratic, participative, collaborative, and empowering) perceived discrepancies between the importance of organizational support and the presence of organizational support in their work environment. The low number of individuals in the autocratic supervision style group may account for nonsignificant results between Importance and Presence scales.

Further, each supervision style group had nonsignificantly different means on the Importance scales. However, for Presence scale analyses, individuals in the collaborative and empowered supervision style groups tended to perceive significantly higher levels of organizational support in their work environment. The hypothesis that individuals would perceive support systems differentially as a function of supervision style, was partially supported.

Effective Team Profiles and Support Systems Survey Scales

To evaluate the hypothesis that the profiles of Importance and Presence scales can differ for effective teams (H7C), profile analysis using SPSS MANOVA was employed. Profile analysis is useful in determining whether groups have a similar pattern of highs and lows on dependent variables (Tabachnick & Fidell, 1996). In this case, profile analysis was used to determine if effective groups (note that this is perceived effectiveness) can have different profiles (e.g., different patterns of highs and lows on the Supports Systems Survey scales). Nonsignificant MANOVA results indicate that the profiles are similar.
Four effective teams were selected using Composite Effectiveness scores. Group-level Composite Effectiveness means were computed for each team. Then, teams with at least four individuals and the highest group-level means were selected as independent variables. Note that only one team with at least four individuals had a score one standard deviation above the mean for the group-level Composite Effectiveness score distributions. Thus, the distribution of the group-level Composite Effectiveness scores was examined for "natural" breaks to find the teams with the highest effectiveness scores. Using this method, four teams appeared to have scores higher than other teams and had at least four persons in each team. Two teams were located in an oil refinery company (teams S76 and S74) and two teams were located in a company that produces phone directories (teams F02 and F06). Profiles for the four teams were examined in terms of Importance and Presence scales.

**Importance Scales**

The MANOVA design was 4 teams X 9 Importance scales (Group Design, Defining Performance, Information, Direct Supervisor, Executive Manager, Training, Performance Appraisal, Rewards, and Integration). Scales was the within subjects factor; team was the between subjects factor.

Analyses indicated nonsignificant results for the test of parallelism, $F (24, 12) = 1.21, p = .318$, and nonsignificant results for team, $F (3, 11) = 0.75, p = .542$. Thus, profiles of Importance scale means appear to be parallel among the teams and all teams had nonsignificantly different means on the Importance Scales. Figure 14 illustrates Importance scale means for teams S76, S74, F02, and F06.
Figure 14. Importance Scale Means for Teams S76, S74, F02, and F06: Group Design (GD), Defining Performance (DP), Information (IF), Direct Supervision (DS), Executive Management (EM), Training (TR), Performance Appraisal (PA), Rewards (RW), and Integration (IT).

Presence Scales

The MANOVA design was 4 teams X 9 Presence scales (Group Design, Defining Performance, Information, Direct Supervisor, Executive Manager, Training, Performance Appraisal, Rewards, and Integration). Scales was the within subjects factor; team was the between subjects factor. Analyses indicated significant results for the test of parallelism, $F (24, 12) = 2.94, p = .027$, and nonsignificant results for team, $F (3, 11) = 2.34, p = .129$. However, after Scheffe adjustments to control for familywise error rates (Hays, 1988), simple effects were nonsignificant. Thus, the team profiles of Presence scale means appear to be parallel. Further, each team had nonsignificantly different means on the Presence Scales compared to each other team. Figure 15 illustrates Presence scale means for teams S76, S74, F02, and F06.
Figure 15. Presence Scale Means for Teams S76, S74, F02, and F06: Group Design (GD), Defining Performance (DP), Information (IF), Direct Supervision (DS), Executive Management (EM), Training (TR), Performance Appraisal (PA), Rewards (RW), and Integration (IT).

Results suggest that teams with high levels of perceived effectiveness have similar profiles in terms of the importance of organizational support to work groups and the presence of organizational support in their work environments. Additionally, Composite Effectiveness analyses suggest that teams with different levels of effectiveness have similar profiles, with the Group Design, Defining Performance, Information, and Direct Supervisor scales at the high end of the profile, and the other scales at the lower end of the profile. The hypothesis that individuals in teams perceived as effective could have different support system profiles, was not supported. However, this data set may not be suited to testing this hypothesis. Further exploration of effective team profiles is recommended.
Multiple Regression

Stepwise multiple regression was performed using SPSS REGRESSION to determine how the Support Systems Survey Importance and Presence scales, and the Empowerment scales, predict the Perceptions of Team Performance scales (H7B). Results for each of the Perception of Performance scale is presented and briefly discussed.

Importance Scales and Customer Satisfaction

Stepwise regression was employed to determine which Importance Support Systems Survey scales best predict the Customer Satisfaction scale. The Group Design and Executive Managers scales were found to significantly predict the Customer Satisfaction scale, $F (2, 331) = 5.94, p = .003$. Note that the Executive Manager scale was negatively related to the Customer Satisfaction scale. Table 28 displays the unstandardized regression coefficients ($B$), the standardized regression coefficients (Beta), $R$, $R$ squared, and adjusted $R$ Squared.

Table 28

Regression Analyses Results: Importance Scales Predicting Customer Satisfaction

<table>
<thead>
<tr>
<th>Importance Scale</th>
<th>B</th>
<th>Beta</th>
<th>R</th>
<th>R Squared</th>
<th>Adjusted R Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Design</td>
<td>2.41</td>
<td>.25</td>
<td>.19*</td>
<td>.03</td>
<td>.21</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>-1.41</td>
<td>-.20</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .01$
Presence Scales and Customer Satisfaction

Stepwise regression was employed to determine which Presence Support Systems Survey scales best predict the Customer Satisfaction scale. Results indicated that the Group Design and Defining Performance scales significantly predicted the Customer Satisfaction scale, $F(2, 334) = 46.31, p = .000$. Table 29 displays the unstandardized regression coefficients ($B$), the standardized regression coefficients (Beta), $R$, $R^2$, and adjusted $R^2$.

Table 29

Regression Analyses Results: Presence Scales Predicting Customer Satisfaction

<table>
<thead>
<tr>
<th>Presence Scale</th>
<th>B</th>
<th>Beta</th>
<th>$R$</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Design</td>
<td>2.15</td>
<td>.28</td>
<td>.47*</td>
<td>.22</td>
<td>.21</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>1.47</td>
<td>.21</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .01$

Results suggest that Presence scales are better predictors of the Customer Satisfaction scale than Importance scales. Further, analyses indicate that effective group design and clear group goals are related to customer satisfaction (e.g., meeting customer needs, creating quality products, and providing quality services). Importance scale analyses provide further evidence that effective group design is related to meeting customer needs. For Importance scale analyses, the Executive Manager scale enhanced the predictive value of the Group Design scale by suppressing irrelevant variance.
Importance Scales and Psychological Effectiveness

Stepwise regression was employed to determine which Importance Support Systems Survey scales best predict the Psychological Effectiveness scale. Results indicated that the Defining Performance, Executive Manager, and Information scales, significantly predicted the Psychological Effectiveness scale, $F(3, 343) = 13.73, p = .000$. Note that the Executive Manager scale was negatively related to the Psychological Effectiveness scale. Table 30 displays the unstandardized regression coefficients (B), the standardized regression coefficients (Beta), R, R Squared, and adjusted R Squared.

Table 30

<table>
<thead>
<tr>
<th>Importance Scale</th>
<th>B</th>
<th>Beta</th>
<th>R</th>
<th>R Squared</th>
<th>Adjusted R Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>3.69</td>
<td>.33</td>
<td>.32*</td>
<td>.10</td>
<td>.10</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>-3.01</td>
<td>-.32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defining Performance</td>
<td>2.46</td>
<td>.23</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .01$

Presence Scales and Psychological Effectiveness

Stepwise regression was employed to determine which Presence Support Systems Survey scales best predict the Psychological Effectiveness scale. Results indicated that the Defining Performance, Executive Manager, and Information scales, significantly predicted the Psychological Effectiveness scale, $F(3, 345) = 75.10, p = .000$. Table 31 displays the unstandardized regression coefficients (B), the standardized regression coefficients (Beta), R, R Squared, and adjusted R Squared.
Table 31

Regression Analysis Results: Presence Scales Predicting Psychological Effectiveness

<table>
<thead>
<tr>
<th>Presence Scale</th>
<th>B</th>
<th>Beta</th>
<th>R</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defining Performance</td>
<td>2.36</td>
<td>.26</td>
<td>.63*</td>
<td>.40</td>
<td>.39</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>1.95</td>
<td>.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td>1.95</td>
<td>.21</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .01$

Results suggest that Presence scales are better predictors of the Psychological Effectiveness scale than Importance scales. Further, analyses indicate that clear group goals, supportive executive management, and effective information systems, are related to the psychological welfare of group members (e.g., growth opportunities, organizational commitment, and job satisfaction). Importance scale analyses provide further evidence that clear group goals and effective information systems are related to group member psychological needs. For Importance scale analyses, the Executive Manager scale enhanced the predictive value of the Performance Definition and Information scales by suppressing irrelevant variance.

Importance Scales and Resource Utilization and Development

Stepwise regression was employed to determine which Importance Support Systems Survey scales best predict the Resource Utilization and Development scale. Results indicated that the Defining Performance, Executive Manager, Rewards, and Training scales, significantly predicted the Resource Utilization and Development scale, $F(4, 315) = 8.85, p = .000$. 
Note that the Executive Manager scale was negatively related to the Resource Utilization and Development scale. Table 32 displays the unstandardized regression coefficients (B), the standardized regression coefficients (Beta), R, R Squared, and adjusted R Squared.

Table 32

<table>
<thead>
<tr>
<th>Importance Scale</th>
<th>B</th>
<th>Beta</th>
<th>R</th>
<th>R Squared</th>
<th>Adjusted R Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Manager</td>
<td>-5.79</td>
<td>-.53</td>
<td>.32*</td>
<td>.10</td>
<td>.09</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>4.54</td>
<td>.37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>1.98</td>
<td>.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rewards</td>
<td>1.30</td>
<td>.15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* P < .01

Presence scales and Resource Utilization and Development

Stepwise regression was employed to determine which Presence Support Systems Survey scales best predict the Resource Utilization and Development scale. Results indicated that the Defining Performance and Group Design scales significantly predicted the Resource Utilization and Development scale, F (2,319) = 59.79, p = .000. Table 33 displays the unstandardized regression coefficients (B), the standardized regression coefficients (Beta), R, R Squared, and adjusted R Squared.

Results suggest that Presence scales are better predictors of the Resource Utilization and Development scale than Importance scales. Analyses indicate that in terms of perceived current support, effective group design and clear group goals are
related to the effective use of group resources and the development of team capabilities (e.g., cost control, use of team member expertise, and increased production).

Table 33

**Regression Analyses Results: Presence Scales Predicting Resource Utilization and Developmental Effectiveness**

<table>
<thead>
<tr>
<th>Presence Scale</th>
<th>B</th>
<th>Beta</th>
<th>R</th>
<th>R Squared</th>
<th>Adjusted R Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Design</td>
<td>3.63</td>
<td>.31</td>
<td>.52*</td>
<td>.27</td>
<td>.27</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>2.54</td>
<td>.24</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .01

Further, in terms of what is perceived as important group support, Importance scale analyses suggest that clear group goals, training experiences, and group-based reward systems, are related to the development of group skills and the effective use of group resources. For Importance scale analyses, the Executive Manager scale enhanced the predictive value of the Defining Performance, Rewards, and Training scales, by suppressing irrelevant variance.

**Importance scales and Team Effectiveness**

Stepwise regression was employed to determine which Importance Support Systems Survey scales best predict the Team Effectiveness scale. Results indicated that the Group Design and Executive Manager scales significantly predicted the Team Effectiveness scale, F (2, 336) = 18.46, p = .000. Note that the Executive Manager scale was negatively related to the Team Effectiveness scale. Table 34 displays the
unstandardized regression coefficients (B), the standardized regression coefficients (Beta), R, R Squared, and adjusted R Squared.

Table 34

Regression Analyses Results: Importance Scales Predicting Team Effectiveness

<table>
<thead>
<tr>
<th>Importance Scale</th>
<th>B</th>
<th>Beta</th>
<th>R</th>
<th>R Squared</th>
<th>Adjusted R Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Design</td>
<td>4.69</td>
<td>.43</td>
<td>.31*</td>
<td>.10</td>
<td>.09</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>-2.05</td>
<td>-.25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .01

Presence scales and Team Effectiveness

Stepwise regression was employed to determine which Presence Support Systems Survey scales best predict the Team Effectiveness scale. Results indicated that the Direct Supervisor and Group Design scales significantly predicted the Team Effectiveness scale, \( F(2, 339) = 83.75, p = .000 \). Table 35 displays the unstandardized regression coefficients (B), the standardized regression coefficients (Beta), R, R Squared, and adjusted R Squared.

Table 35

Regression Analyses Results: Presence Scales Predicting Team Effectiveness

<table>
<thead>
<tr>
<th>Presence Scale</th>
<th>B</th>
<th>Beta</th>
<th>R</th>
<th>R Squared</th>
<th>Adjusted R Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Design</td>
<td>4.34</td>
<td>.49</td>
<td>.58*</td>
<td>.33</td>
<td>.33</td>
</tr>
<tr>
<td>Direct Supervisor</td>
<td>.93</td>
<td>.13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .01
Results suggest that Presence scales are better predictors of the Team Effectiveness scale than Importance scales. Further, analyses indicate that in terms of what support is available in the current work environment, effective group design and supportive team leadership are related to effective group experiences (e.g., problem-solving, decision-making, and satisfaction with the group). In regard to what is perceived as important organizational support, Importance scale analyses suggest that effective group design is related to positive team member experiences. For Importance scale analyses, the Executive Manager scale enhanced the predictive value of the Group Design scale by suppressing irrelevant variance.

**Importance scales and Composite Effectiveness**

Stepwise regression was employed to determine which Importance Support Systems Survey scales best predict the Composite Effectiveness scale. Table 36 displays the unstandardized regression coefficients (B), the standardized regression coefficients (Beta), R, R Squared, and adjusted R Squared.

Table 36

**Regression Analyses Results: Importance Scales Predicting Composite Effectiveness**

<table>
<thead>
<tr>
<th>Importance Scale</th>
<th>B</th>
<th>Beta</th>
<th>R</th>
<th>R Squared</th>
<th>Adjusted R Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Manager</td>
<td>-11.50</td>
<td>-.39</td>
<td>.34*</td>
<td>.12</td>
<td>.11</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>8.77</td>
<td>.27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>6.31</td>
<td>.22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Design</td>
<td>6.36</td>
<td>.16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .01
Results indicated that Defining Performance, Executive Manager, Group Design, and Training scales, significantly predicted the Composite Effectiveness scale, $F(4, 298) = 9.91, p = .000$. Note that the Executive Manager scale was negatively related to the Composite Effectiveness scale.

Presence scales and Composite Effectiveness. Stepwise regression was employed to determine which Presence Support Systems Survey scales best predict the Composite Effectiveness scale. Results indicated that the Defining Performance and Group Design scales significantly predicted the Composite Effectiveness scale, $F(2, 301) = 99.29, p = .000$. Table 37 displays the unstandardized regression coefficients ($B$), the standardized regression coefficients ($\beta$), $R$, $R^2$, and adjusted $R^2$.

Table 37

<table>
<thead>
<tr>
<th>Presence Scale</th>
<th>$B$</th>
<th>$\beta$</th>
<th>$R$</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Design</td>
<td>11.80</td>
<td>.37</td>
<td>.63*</td>
<td>.40</td>
<td>.39</td>
</tr>
<tr>
<td>Defining Performance</td>
<td>8.48</td>
<td>.29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .01$

Results suggest that Presence scales are better predictors of the Composite Effectiveness scale compared to Importance scales. Analyses indicate that in terms of available organizational support, effectively designed groups and groups with clear goals, are related to group effectiveness (e.g., the psychological welfare of group members; satisfactory group experiences; the effective use of resources and the development of team capabilities; and customer satisfaction). In terms of what is considered important
organizational support, Importance scale analyses suggest that effective group design, training experiences, and clear group goals, are related to group effectiveness. For Importance scale analyses, the Executive Manager scale enhanced the predictive value of the Defining Performance and Group Design scales by suppressing irrelevant variance.
CHAPTER IV

DISCUSSION

Overview

This primary purpose of this research study was to examine individuals' perceptions of organizational support and the relationship of this support to effectiveness and empowerment. Based on Mohrman, Cohen, and Mohrman's (1995) conceptual framework for team-based organizations and eight team effectiveness models, organizational support was operationalized in terms of nine systems: executive management, direct supervision, group design, performance definition, performance review, training, rewards, information, and integration systems. Additionally, subjects rated support systems in two ways: (1) how important is this support for getting work done (Importance scales); and (2) how does the support describe your work group (Presence scales). Importance scales represent how subjects perceive the importance of support systems in terms of performing work. Presence scales represent how subjects perceive the support in terms of describing their current work environment. Subjects also completed a demographics survey and measures of effectiveness and empowerment.

The remainder of this paper interprets results for the Support Systems Survey and its relationship to effectiveness, empowerment, and several demographic questions. Specifically, the following analyses are discussed: correlations between Support Systems Survey, Empowerment, and Effectiveness scales; Perception of Team Performance scales...
and their relationship to the team effectiveness literature; and the hypotheses discussed in
the literature review of this paper, are discussed. Finally, limitations of this study are
presented and suggestions for future research are discussed.

**Correlational Analyses**

In this section, correlational analyses are discussed. First, correlations within
scale types are discussed, including correlations between Importance scales, Presence
scales, Empowerment scales, and Effectiveness scales. In the next section, correlations
between types of scales are discussed, including relationships between Importance and
Presence scales, between Importance and Effectiveness scales, and relationships between
Presence, Empowerment, and Effectiveness scales, are briefly discussed.

**Within Scale Correlations**

In this section, correlations within scale types are discussed. The relationship
between Importance scales, Presence scales, Empowerment scales, and Effectiveness
scales are briefly reviewed below. Hypotheses are discussed in later sections

**Relationships Between Importance Scales**

Importance scale correlations were highest between the Information and Defining
Performance scales ($r = .82$), the Information and Direct Supervision scales, ($r = .80$), and
between the Defining Performance and Executive Managers scales ($r = .80$). In terms of
what is perceived as important to performing work, subjects see high relationships
between information and goal-setting, information and direct supervision, and
goal-setting and executive management behaviors.
High correlations between these scales might be expected given the relationship between these types of support in the work literature. For instance, executive managers ensure that organizational goals and objectives are clear (Elden, 1994) and that teams understand the organization's vision and mission (Harrington-Mackin, 1996). Similarly, supervisors often provide teams with information about organizational needs (Sims & Manz, 1994). Performance definition is also an information function, since teams receive information about performance and how performance relates to organizational goals and priorities (Mohrman et al., 1995).

Relationships Between Presence Scales

For Presence scales, correlations were highest between the Defining Performance and Group Design scales (r = .81) and between the Defining Performance and Information scales (r = .80). In terms of the current work environment, relationships were highest between goal-setting and work group design, and between goal-setting and information systems. These results are important, since goal-setting is highly related to effective group performance (Mohrman et al., 1995). Further, information on organizational priorities allows teams to align team goals with organizational goals (Mohrman et al., 1995).

Relationships Between Empowerment Scales

Empowerment scale correlations were highest between the Consequences and Meaningfulness scales (r = .74). Kirkman and Rosen (1996) reported similar results. Thus, groups with meaningful tasks and goals are related to groups performing important, customer associated tasks. These results seem appropriate, since empowerment includes
an understanding of organizational goals and alignment between organization and team goals (Mohrman et al., 1995). These results suggest that organizations are emphasizing customer needs and that meaningful tasks and goals are related to customer needs.

**Relationships Between Effectiveness Scales**

For Effectiveness scales, correlations were highest between the Psychological Effectiveness and Team Effectiveness scales \( r = .68 \). Thus, high relationships exist between the psychological needs of group members (e.g., team member growth opportunities and organizational commitment) and the ability of team members to function as a group (e.g., team member satisfaction with the team, group decision-making ability, and group problem-solving ability). This is consistent with May and Schwoerer's (1994) research findings: team members' confidence and ability to perform work, increases as a function of successful team experiences.

**Between Scale Correlations**

In this section, correlations between types of scales are discussed. Relationships between Importance and Presence scales, between Importance and Effectiveness scales, and relationships between Presence, Empowerment, and Effectiveness scales, are briefly addressed.

**Relationships Between Importance Scales and Presence Scales**

Correlations between the Support Systems Survey Importance scales and Presence scales were surprisingly low, ranging from .13 (Training Importance scale with Executive Management Presence scale) to .52 (Direct Supervision Importance scale with Direct Supervision Presence scale). Low correlations between Importance and Presence scales
suggest that a low relationship exists between organizational support subjects perceive as "ideal", and organizational support available in the current work environment. Further, correlations between Presence scales are low compared to correlations between Importance scales. The low Presence scale intercorrelations (compared to Importance scale intercorrelations) suggest that there are low relationships between systems in subjects' current work environment. However, Importance scale correlations suggest that high relationships between systems—alignment between systems—are an important component of supportive organizational contexts.

This is an extremely important finding, since alignment between organizational systems is a critical feature of effective organizations (Labovitz & Rosansky, 1997). Labovitz and Rosansky (1997) argued that organizational leadership aligns organizational systems by: (1) carefully determining and articulating the essence of an organization's business; (2) defining critical strategic goals and educating organizational constituents on these goals; (3) developing performance measures of these goals; (4) aligning rewards and recognition programs with performance measures; and (5) reviewing performance to ensure goals are met. Alignment between systems links organizational strategy and employees, and integrates both to address customer requirements and create process improvements. Alignment creates an organizational "culture" that allows organizations to adjust to changing business environments.

**Relationships Between Importance Scales and Effectiveness Scales**

Correlations between Support Systems Survey Importance scales and the Effectiveness scales were surprisingly low. Correlations ranged from -.03 to .25. This
suggests that little relationship exists between what is considered important organizational support and group's current performance. Organizations may not be developing an aligned system of support resources needed to increase Customer Satisfaction, Team Effectiveness, Psychological Effectiveness, and Resource Utilization and Development. Alignment facilitates the development of cultures which increases organizational effectiveness (Labovitz & Rosansky, 1997) and helps teams set goals to meet organizational goals (Mohrman et al., 1995).

In addition, the Executive Manager Importance scale was negatively related to the Customer Satisfaction scale ($r = -.03$), and negatively related to the Resource Utilization and Development Scale ($r = -.01$). These suggests that employees perceive a low relationship between important executive management behaviors, and employees’ ability to satisfy customer, utilize resources, and improve work processes. This is important finding given the role executive management plays in team-based organizations (Block, 1993; Campion, Medsker, & Higgs, 1993; Elden, 1994). Executive managers develop the organizational contexts which allow teams and other organizational constituents to be effective (Mohrman et al., 1995).

**Relationships Between Presence, Effectiveness, and Empowerment Scales**

Examination of correlations between types of scales indicates that correlations were high between Presence and Empowerment scales, and between Empowerment and Effectiveness scales. In particular, the Group Design Presence scale had high correlations (compared to other Presence scales) with the Effectiveness and Empowerment scales. This suggests that subjects perceive the highest relationship, in terms of what describes
their current work environment, between the design of their work environment and the perception of empowerment and effectiveness. Regression analyses provide additional evidence that group design is highly related to Effectiveness and Empowerment. Subjects also rated the Group Design scale highest (compared to other support systems) for both Importance and Presence scales.

This finding is unexpected. Much of the work team literature emphasizes the role of leadership in team-based organizations. For instance, Sims (1997, personal communication) argued that teams rely more upon leadership behaviors than other contextual factors. In addition, many popular books on work teams emphasize the importance of leadership over other organizational systems (e.g., Block, 1993; Fisher, 1993; Lawler, 1992; Zenger, Musselwhite, Hurson, & Perrin, 1994).

However, the relationship of group design to team effectiveness is well documented. For example, many of the team effectiveness models emphasize the importance of group design and its relationship to team effectiveness (e.g., Cohen, 1994; Gladstein, 1984; Hackman, 1987; May & Schoener, 1994). The importance of effective group design and its relationship to work team effectiveness, is discussed in additional detail below.

Finally, the Consequences scale had relatively high correlations (compared to other Empowerment scales) with the Effectiveness scales. Thus, teams that perform important, customer associated tasks is related to Customer Satisfaction, Team Effectiveness, Psychological Effectiveness, and Resource Utilization and Development. This result is not surprising given the emphasis organizations place on meeting customer
needs (Labovitz & Rosansky, 1997). The relationship between customer satisfaction and effectiveness is also discussed in detail below.

Perception of Team Performance Scales

In this section, results from analyses of the Perception of Team Performance Survey are discussed. The Psychological Effectiveness, Customer Satisfaction, Team Effectiveness, and Resource Utilization and Development scales are discussed in terms of the team effectiveness models presented in the literature review of this paper.

Psychological Effectiveness Scale

The Psychological Effectiveness scale consists of the following items: group member growth opportunities, trust with leadership, commitment to the organization, and satisfaction with the job. Further, Psychological Effectiveness scale items have been identified as important components of group effectiveness in the work team literature. For instance, satisfaction with the team and job is an outcome of effective teams (Gladstein, 1984). Team members' attitudes, such as social processes that affect group members' ability to work together in the future, and social processes that satisfy group member needs, are important outcomes of effective teams (Hackman, 1987). In addition, effective teams have successful team experiences, including satisfying training experiences, an environment where individuals learn from each other, and tasks that teach group members new skills (May & Schwoerer, 1994). Finally, Cohen (1994) argued that the effectiveness of groups can be measured by team member attitudes toward quality of work life. Thus, satisfying jobs, growth opportunities, and commitment to the organization, appear to be important criteria for assessing team effectiveness.
Customer Satisfaction Scale

The Customer Satisfaction scale consists of the following items: creating quality products, satisfying customers' needs, providing quality service to customers, and responding to customer needs. Further, similar to the Psychological Effectiveness scale, Customer Satisfaction scale items have been identified as important components of group effectiveness in the work team literature. For example, Shea and Guzzo (1987) argued that customer service behaviors are good measures of group performance. Hackman (1987) proposed that group effectiveness is a function of group outputs, and how they meet or exceed performance standards of the group's customers. In addition, Mohrman et al. (1995) indicated that feedback from internal and external customers is critical to a team's success. Teams can settle many internal disagreements by maintaining a customer focus and having accurate data regarding customer preferences. Finally, the outputs of teams, such as increased response time and improved quality, is related to increased customer satisfaction (Orsburn, Moran, Musselwhite, & Zenger, 1990). Thus, another important component of team effectiveness is the ability to create outcomes that satisfy customers and the ability to produce high quality products and services.

Team Effectiveness Scale

The Team Effectiveness scale is composed of the following items: group members' desire to work with the group in the future; group members' satisfaction with the group; group members' problem-solving effectiveness; group members' decision-making effectiveness; and group members' belief in the ability to perform jobs. Additionally, the Team Effectiveness scale describes many of the elements Hackman
(1987) described as "group synergy". Group synergy consists of group process skills which facilitate efficient implementation of task performance strategies. Similarly, Gladstein (1984) proposed that effective teams have internal process skills, such as effective problem-solving skills and effective decision-making skills, which improve team outputs.

Additional research also supports the importance of group process skills and the outcomes that result from effective internal team processes. Shea and Guzzo (1987) argued that effective groups believe they can be effective. Further, effective teams have successful team experiences, which increase the belief that team members can perform work (May & Schwoerer, 1994). Finally, effective teams are designed to increase the number of ideas available from team members, which can improve group-level decision-making skills and group-level job skills (Pearce & Ravlin, 1987). Thus, the team literature supports the relationship between group process skills and team effectiveness.

Resource Utilization and Development Scale

Finally, the Resource Utilization and Development scale consists of the following items: controlling costs, cycle time, innovation, increased capacity, use of expertise on the group, and increased production. Similar to other scales, items which make up the Resource Utilization and Development scale have been identified as important components of group effectiveness. For instance, Hackman (1987) argued that appropriate group design facilitates the use of group member expertise in the group, the use of task appropriate strategies, and the development of innovative and creative
performance strategies. May and Schwoerer (1994) argued that an effective team culture promotes the free exchange of ideas, which then facilitates team effectiveness. Finally, Pearce and Ravlin (1987) proposed that evaluation of team effectiveness should include the innovation and productivity of the team. Thus, the team literature supports a strong relationship between team effectiveness and the use and development of team resources.

To summarize this section, the work team literature suggests that customer satisfaction, effective group interaction processes, satisfactory team experiences and team member growth opportunities, and the ability of teams to utilize group resources and develop more efficient work processes, are important outcomes of effective teams. However, there are other types of team effectiveness (e.g., withdrawal behaviors; Cohen, 1994), which are not measured by the Perception of Team Performance scales, and these scales could use additional elaboration. Further development and research on these scales is recommended.

Hypotheses

In this section of this paper, hypotheses are discussed. Specifically, the following research questions are examined, including: the relationship between the Support Systems Survey Importance and Presence scales; the relationship between perceived importance and presence of organizational support in terms of perceived empowerment; the relationship between perceived importance and presence of organizational support and perceived effectiveness; the predictive value of Importance and Presence scales and their relationship to effectiveness; Importance and Presence scale profiles as a function of four effective teams; the relationship between perceptions of Importance and Presence
of organizational support as a function of single-functional versus multi-functional teams; the relationship between perceptions of Importance and Presence of organizational support in terms of supervisor role; the relationship between perceptions of Importance and Presence of organizational support as a function of knowledge development stage; the relationship between perceptions of Importance and Presence of organizational support in terms of team or nonteam membership; the relationship between perceptions of Importance and Presence of organizational support as a function of team duration; and the relationship between perceptions of Importance and Presence of organizational support in terms of team tasks.

Differences Between Support Systems Survey Importance Scale and Presence Scales

One research question concerns the importance of support systems relative to one another, and differences between employees' perception of Importance of organizational support and Presence of organizational support, in their work environments. Little empirical research exists evaluating differences between employees' perception of important organizational support and employees' perception of available organizational support in their work environments. However, analyses of the Support Systems Survey Importance and Presence scales resulted in significant differences between each Importance scale and its Presence scale counterpart. For each Support Systems Survey scale, subjects rated Importance scales significantly higher than Presence scales. Further, if the difference between Importance and Presence scales are considered to be a measure of satisfaction, then subjects appear dissatisfied with their current level of organizational
support. Figure 16 illustrates the relationship between Importance and Presence scale means for the entire sample.

![Graph](image)

**Figure 16.** Importance and Presence Overall Means for the Group Design (GD), Defining Performance (DP), Information (IF), Direct Supervision (DS), Executive Management (EM), Training (TR), Performance Appraisal (PA), Rewards (RW), and Integration (IT) Scales.

Additionally, whereas Mohrman et al. (1995) argued that performance definition had the highest relationship to effectiveness, Sims and Manz (1994) argued that leadership is the most critical component of team effectiveness. The models of team effectiveness identify different organizational components of team effectiveness, but do not specify which types are most related to effectiveness. Examination of Figure 16 suggests that compared to other Support Systems Survey scales, subjects perceived the Group Design scale as the most important component for performing work, and as the most descriptive component of their work environment. With one exception (discussed below) additional analyses of the Support Systems Survey Scales support this result: for
both Presence and Importance scales, the Group Design scale had a significantly higher mean than each other scale.

Thus, the effective design of teams is perceived by employees to be the most important component for completing group work. Furthermore, organizations appear to be providing this type of support to employees: subjects rated the Group Design scale highest in terms of describing their work environment. This suggests that organizational leadership should emphasize Group Design over other types of organizational support. Specifically, the items of the Group Design scale could serve as a useful planning tool.

For instance, the following resources could be made available to groups: (1) the ability to make work-related decisions, improve how work is performed, and make day-to-day decisions about work; (2) the ability to work directly with customers; (3) a group composed of individuals who have the necessary work skills, can easily learn new skills, have good interpersonal skills, and who take responsibility for work; (4) the ability to access experts in other work areas; (5) the time to set goals and improve work processes; (6) the responsibility for tracking work performance; (7) the ability to access business knowledge needed to perform work; and (8) the power to fix quality errors.

Correlational and regression analyses provide additional evidence that Group Design scale items are highly related to group effectiveness.

The Relationship Between Group Design and Group Supervisors

It was argued previously that the importance of effective group design relative to other types of organizational support, seems contrary to much of the literature on work teams. For instance, Sims and Manz (1994) argued that leadership is the most important
component of an effective group; Mohrman et al., (1995) indicated that performance
definition was most related to effective group performance; and Lawler (1992) noted that
management style is a critical factor in developing organizational competitiveness.

However, the work team literature also suggests that a clear relationship exists
between the supervision role and effective group design: supervisors provide teams with
the power and resources needed to make work decisions and improve work processes.
For instance, Fisher (1993) argued that many teams succeed, because supervisors
empower teams through example and commitment. Zenger, Musselwhite, Hurson, and
Perrin (1994) argued that the success of a manager in today's economic environment
depends upon his or her ability to teach team members how to acquire knowledge, learn
new skills, and work independent of direct supervision.

Additionally, Presence scale analyses suggest that organizations are developing
the internal abilities of group members through team leadership. For Presence scales, the
Direct Supervisor scale mean was the only mean nonsignificantly different from the
Group Design scale mean. Further, regression analyses indicate that the Group Design
and Direct Supervision scales were the best predictors of the Team Effectiveness scale
(e.g., problem-solving, decision-making, and satisfaction with the group). This suggests
that direct supervision compliments, and perhaps supports, the design of effective groups.
This finding deserves further research.

Employee Satisfaction and Support Systems

Further, if the difference between Importance and Presence scales are considered
to be a measure of employee satisfaction with organizational support, then employees are
least satisfied with their rewards systems and the support received from executive management. Comparison between Importance and Presence scale means produced the largest differences when the Executive Manager and Rewards scales were examined. One explanation for these results is that these systems are more difficult to implement compared to other systems. For instance, Mohrman et al. (1995) noted that executive managers often have difficulties adapting to the demands of team-based organizations. Executive managers often support employee involvement initiatives but also serve as role models for the ideas, values, and beliefs that may impede employee involvement initiatives (Chelte et al., 1989). Ledford and Lawler (1994) argued that rewards systems have been one of the most stable aspects of management practices over the last several decades. Technological change is decreasing the number of job categories, grades, and salary bands, since conventional pay systems cannot be revised quickly enough to meet organizational needs. Few employees are rewarded for the variety of behaviors that support new business initiatives, such as willingness to work cross-functionally, to take on increased responsibility, and to focus on quality products and services.

The significant mean differences between Executive Management and Reward Importance scales and their Presence scale counterparts is an important finding, since both types of support are recognized as critical components of team-based organizations (Mohrman et al., 1995). For example, teams are extremely difficult to implement without executive management support (Chelte, Hess, Fanelli, & Ferris, 1989; Dyer, 1994; Harrington-Mackin, 1994). Executive managers support the development of systems that facilitate team-based behaviors, including reward systems (Gross, 1995), performance
management systems (Mohrman et al., 1995), and team-based information systems (Block, 1993). Further, group-based reward systems are critical components of effective teams (Cohen, 1994; Gladstein, 1984; Hackman, 1987; Pearce & Ravlin, 1987; Shea & Guzzo, 1987; Sundstrom, De Meuse, & Futrell, 1990). Group-level reward systems are related to high performance (Mohrman et al., 1995), and facilitate team effectiveness by increasing individuals' motivation to coordinate work activities (Pearce & Ravlin, 1987). Thus, in terms of developing supportive contexts, organizations appear to need the most improvement in terms of developing supportive Executive Manager and Rewards systems.

Section Summary

In summary, results suggest that organizations are providing less organizational support than subjects consider ideal. This finding is important, since Effectiveness scale analyses suggest that organizations can increase team effectiveness through development of their support systems. In addition, organizations appear to be using the direct supervision of teams as a mechanism for designing effective groups. This result is meaningful, since group design was perceived by employees to be the most important component for producing work. Finally, employees seem least satisfied with their rewards systems and with executive management support, which suggests that organizations have the most difficulty implementing these types of systems compared to the other types of support studied in this research paper.
Support Systems Importance and Presence Scales and Level of Empowerment

Another research question concerns how teams with different levels of empowerment perceive the Importance and Presence of organizational support. Kirkman and Rosen found evidence to suggest that team empowerment was related to empowering leader behaviors, responsibility for external customers, access to information, access to resources, inter-team coordination, and the development of team procedures and rules. This suggests that compared to teams with lower levels of empowerment (Potency, Meaningfulness, Autonomy, and Consequences), teams with higher levels of empowerment may also have higher levels of organizational support. The following Empowerment scale analyses are discussed in terms of Importance scales, Presence scales, and significant differences between Importance and Presence scales.

Importance Scales

In general, when compared to low and medium empowerment groups, subjects who perceived their groups as having high levels of empowerment also perceived organizational support as more important. Subjects in the high Autonomy, Meaningfulness, and Consequences groups, perceived the Group Design, Defining Performance, Information, Direct Supervision, Training, and Integration scales, as more important than the low or medium groups. These results are similar for the Composite Empowerment analyses. Figure 17 illustrates Importance scale means as a function of high, medium, and low Composite Empowerment.
Analyses suggest that organizational resources are considered to be more important by highly empowered work teams than low or medium empowered teams. These results are supported in the work team literature, since high levels of empowerment is often defined in terms of the resources offered by management to employees. For instance, Lawler (1992) argued that employee involvement is partially dependent upon employees receiving the information and knowledge necessary to perform work. Fisher (1993) warns that employees cannot perceive themselves as empowered without the power and resources (e.g., knowledge and information) needed to perform work. Mohrman et al. (1995) proposed that teams need the knowledge, information, and resources to make a difference in the organization.

However, results suggest that the definition of what is considered important "resources" might include other organizational components, such as effective Group Support Systems (Importance Scales).

Figure 17. High, Medium, and Low Composite Empowerment Group Means for the Group Design (GD), Defining Performance (DP), Information (IF), Direct Supervision (DS), Executive Management (EM), Training (TR), Performance Appraisal (PA), Rewards (RW), and Integration (IT) Importance Scales.
Design, Defining Performance, Direct Supervisor support, Training, and Integration mechanisms. Thus, mechanisms in the Group Design, Defining Performance, Information, Direct Supervision, Training, and Integration scales, might represent specific methods for increasing employees' perceived empowerment.

**Empowerment analyses and the Rewards and Performance Appraisal Scales.**

Other Importance scale analyses indicate a different pattern of results for the Rewards and Performance Appraisal scales: The importance of Rewards and Performance Appraisal systems does not change as a function of high, medium, or low Empowerment. With the exception of the Consequences scale, employees perceived the importance of the Rewards and Performance Appraisal systems similarly, regardless of empowerment level. These results may be due to the role Rewards and Performance Appraisal systems play in organizations. All employees may be aware of the importance of these systems, since they have such a large impact upon employees (Gross, 1995; Mohrman et al., 1995). These results suggest that organizational leadership should be very sensitive to employees' needs when developing Rewards and Performance Appraisal systems.

However, Consequences analyses appear to contradict this conclusion. Individuals in the high Consequences group perceived rewards systems as more important than individuals in the low Consequences group. This result suggests that individuals who perceive their groups as performing highly important, customer related tasks, are more aware of the importance of team-based rewards systems. One possible explanation for this result is that organizational leadership have aligned rewards systems to ensure that the needs of customers are met. However, organizational leadership has not aligned
rewards systems with the other types of empowerment. The role of rewards and performance appraisal systems, and their relationship to empowerment, could use further study.

**Empowerment analyses and the Potency Scale.** Finally, Empowerment scale analyses indicate that high, medium, and low levels of Potency produced fewer significant differences between Importance scales, compared to other Empowerment scales. Subjects who perceived themselves as having high levels of Potency had significantly higher mean scores for the Group Design and Performance Appraisal scales, than individuals in the medium and low Potency groups. Other analyses were nonsignificant. One possible explanation for this result is that group Potency (e.g., groups with expectations of high performance, and groups with high levels of confidence) is more influenced by effective group design and clear goal-setting systems. In contrast, perception of high Autonomy, Consequences, and Meaningfulness, may depend on a larger “set” of support systems. This possibility could also benefit from further research.

**Presence Scales**

Presence scale analyses provide an interesting illustration of the relationship between organizational support and empowerment: Presence scale analyses indicate that there is a direct link between subjects' perceived level of empowerment and subjects' perception of organizational support in their work environment.

For example, with the exception of the Rewards scale, individuals who perceived their work groups as highly empowered (Potency, Autonomy, Meaningfulness, Consequences, and the Composite Empowerment scale) rated each support system as
more descriptive of their work environment, than subjects who perceived their group as having low levels of empowerment. Additionally, in many cases, individuals who perceived themselves as having medium levels of empowerment had higher Presence scale scores, than individuals who perceived themselves as having low levels of empowerment.

The most dramatic example of the relationship between organizational support and empowerment was for the Consequences and Composite Empowerment scales. With the exception of the Rewards scale, each level of Empowerment (high, medium, or low) had significantly different means compared to each other level of Empowerment. Thus, as perceived empowerment increases, perceived level of organizational support increases. This suggests that there is a direct relationship between perceived presence of organizational support and level of perceived empowerment. Analyses for the Rewards scale were similar, but did produce significant mean differences between each level (high, medium, or low) of Empowerment. As argued previously, results for the Rewards scale may be due to the difficulty implementing group-based Reward systems. Figure 18 illustrates Presence scale means as a function of high, medium, and low Composite Empowerment.

Thus, analyses suggest that perceived empowerment is directly related to perceived organizational support. To "empower" employees, organizational designers might implement the types of support studied in this research study. Results from this study also suggest that a more dynamic definition of empowerment is needed. Empowerment might be operationalized in terms of the Group Design, Defining
Performance, Information, Direct Supervision, Executive Management, Training, Performance Appraisal, Rewards, and Integration scales. The items in the scales may offer specific mechanisms to increase employee Empowerment.

Figure 18. High, Medium, and Low Composite Empowerment Group Means for the Group Design (GD), Defining Performance (DP), Information (IF), Direct Supervision (DS), Executive Management (EM), Training (TR), Performance Appraisal (PA), Rewards (RW), and Integration (IT) Presence scales.

Importance Scales Versus Presence Scales

If differences between Presence and Importance scales are considered to be a measure of satisfaction with organizational support, then employees in the high Potency, Meaningfulness, Consequences, and Composite empowerment groups tend to be more satisfied with their direct supervisors, training programs, and group-based performance appraisal programs, than individuals in the low and medium empowerment group. In contrast, individuals in the low and medium Potency, Meaningfulness, Consequences, and Composite Empowerment groups were dissatisfied with all organizational support. These results suggest that employees who perceive themselves as highly empowered, tend
to be more satisfied with organizational support, particularly direct supervision, performance appraisal, and training support.

An alternative explanation for these results is that high empowerment groups require specific types of support. In this case, high Potency groups require Direct Supervision and Performance Appraisal support; high Meaningfulness groups require Direct Supervision support; high Consequences groups require Direct Supervision, Training, and Performance Appraisal support; and high Composite Effectiveness groups require Direct Supervision and Performance Appraisal support. Thus, perception of specific types of Empowerment, may mean that organizational leadership aligns organizational support to develop and reinforce the perception.

In other analyses, subjects appear to be least satisfied with the Group Design, Executive Management, and Rewards scales. When the Importance and Presence scales are examined in terms of which scales had the highest significant differences, the Group Design, Executive Management, and Rewards scales have the highest F ratios. These results are similar for low, medium, and high levels of empowerment (Potency, Autonomy, Meaningfulness, Consequences, and Composite Effectiveness). In three instances, the Information scale showed the third highest decrement in place of the Group Design scale. These results are disappointing, since the literature is clear on the importance of effective group design (Cohen, 1994), supportive executive management (Mohrman et al, 1995), and group-based rewards systems (Hackman, 1987).

One explanation for these results is that these systems may be more difficult to implement compared to other types of systems. For instance, executive managers often...
do not invest the time and energy needed to provide an appropriate team-based context (Mohrman et al., 1995). Team-based rewards systems are often in direct conflict with traditional organizational rewards systems (Harrington-Mackin, 1994). The redesign of work systems to support teams can take tremendous amounts of time and energy (Orsburn et al., 1990). Thus, effective group design, executive manager support, and group-based rewards systems, may be the three most difficult systems to implement in team-based organizations.

Support Systems Importance and Presence Scales and Level of Effectiveness

Another important research question concerns the relationship of support systems to team effectiveness. Little research exists concerning which organizational systems (e.g., Reward) are most important to supporting effective teams. The team effectiveness models specify different types of organizational support, but not which of these are most related to team effectiveness. Mohrman et al. (1995) argued that Performance Definition was most related to effectiveness. However, their research appears to have been limited to performance management systems (i.e., Defining Performance, Training, Performance Appraisal, and Rewards). Thus, the Support Systems Survey Presence and Importance scales were examined in terms of high, medium, and low levels of Effectiveness (Customer Satisfaction, Team Effectiveness, Psychological Effectiveness, and Resource Utilization and Development). Results are discussed for Importance scales, Presence scales, and differences between Importance and Presence scales.
Importance Scales

Importance scale analyses suggest that support systems emphasize factors measured by the Customer Satisfaction and Resource Utilization and Development scales. Further, emphasis upon these types of effectiveness may have decreased the ability of systems to provide support for the Psychological Effectiveness and Team Effectiveness scales. Alternatively, Psychological Effectiveness and Team Effectiveness may place more subtle demands upon organizational systems compared to the Customer Satisfaction and Resource Utilization and Development scales.

For instance, analyses indicate that Importance scales were nonsignificantly different as a function of high, medium, or low Customer Satisfaction or Resource Utilization and Development. This suggest that employees know what type of support they need, even if they perceive themselves as ineffective. Individuals in the high Team Effectiveness group, however, had significantly higher means for the Group Design and Defining Performance scales, than individuals in the low Team Effectiveness group. Individuals in the high Psychological Effectiveness group had significantly higher means for the Group Design, Defining Performance, Information, Direct Supervision, Training, and Integration scales, than individuals in the low Psychological Effectiveness group. Figure 19 illustrates Importance scale means as a function of high, medium, and low Composite Effectiveness.

These results suggest that organizations are emphasizing customer needs and the utilization and development of team resources. There were no significant differences
between Importance scales as a function of high, medium, or low Customer Satisfaction or Resource Utilization and Development.

Figure 19. High, Medium, and Low Composite Effectiveness Group Means for the Group Design (GD), Defining Performance (DP), Information (IF), Direct Supervision (DS), Executive Management (EM), Training (TR), Performance Appraisal (PA), Rewards (RW), and Integration (IT) Importance Scales.

One explanation for this result is the current emphasis placed on customer needs and process reengineering (Labovitz & Rosansky, 1997). Total Quality Management, ISO 9000, Employee Involvement programs, and process reengineering are ways organizations have attempted to meet customer needs by developing improved processes. For instance, Total Quality Management and reengineering efforts focus on the customer and work backward to align activities that supply value to the customer (Labovitz & Rosansky, 1997). Thus, employers may be emphasizing customer satisfaction and the utilization and development of resources as a business strategy, and developing organizational systems to meet this strategy.
As a way of further explaining this hypothesis, Importance scales can be viewed in terms of demand: Support Systems Scales may be designed to meet certain work demands or requirements. The high, medium, and low Customer Satisfaction and Resource Utilization and Development groups may not have perceived significant differences between Importance scales, because their organization's systems are constructed to meet these types of demands. However, the high, medium, and low Psychological Effectiveness and Team Effectiveness groups may have perceived significant differences between Importance scales, because these types of effectiveness produce a different kind of demand upon organizational support systems.

This suggests that support systems with a strong emphasis on customer needs and process improvements, may be less capable of meeting more subtle types of effectiveness, such as the psychological needs of employees. For instance, a supervisor may place more emphasis on producing quality products and less emphasis on the psychological welfare of his or her employees. Further, since organizations are concerned with profits, effective use of resources and the development of effective work processes, would probably be their highest priority. In contrast, since scientific management principles continue to dominate the structure of organizations (Lawler, 1992; Nolan & Croson, 1995), the psychological needs of employees are probably less of a priority in such organizations.

At any rate, organizations may wish to consider how they structure support systems to obtain certain outcomes. Too much emphasis on one type of outcome may decrease a system's ability to meet the demands of other types of effectiveness. Sociotechnical systems theory addresses this type of demand in terms of joint
optimization, where the demands of the technical and social systems must be balanced so
that both systems are optimized (Fox, 1995). In terms of support systems, organizations
must create a balance in terms of which outcomes are optimized. Thus, components
within a support systems must be aligned to produce certain outcomes. Organizational
planners may want to ensure that organizational systems meet more subtle effectiveness
needs as well as obvious effectiveness needs.

**Presence Scales**

Analyses of Presence scales reveal a direct link between perceived level of
Effectiveness and perceived Presence of support in subjects' work environments. For
example, compared to individuals in the medium Composite Effectiveness group,
individuals in the high Composite Effectiveness group perceived significantly higher
levels of organizational support in their work environment for each Presence scale.
Further, compared to individuals in the low Composite Effectiveness group, individuals
in the medium Composite Effectiveness group perceived significantly higher levels of
organizational support in their work environment for each Presence scale. Results for the
Psychological Effectiveness scale were similar: each level of perceived Psychological
Effectiveness (high, medium, and low) was significantly different from each other level.
Results were similar for the other Effectiveness scales.

Presence scale results add validity to the model presented in this research study.

The Group Design, Defining Performance, Information, Direct Supervision, Executive
Management, Training, Performance Appraisal, Rewards, and Integration scales, appear
to represent critical components of organizational contexts that facilitate team
effectiveness. Figure 20 illustrates Presence scale means as a function of high, medium, and low Composite Effectiveness.

![Graph showing means for high, medium, and low Composite Effectiveness.]

**Figure 20.** High, Medium, and Low Composite Effectiveness Group Means for the Group Design (GD), Defining Performance (DP), Information (IF), Direct Supervision (DS), Executive Management (EM), Training (TR), Performance Appraisal (PA), Rewards (RW), and Integration (IT) Presence Scales.

**Differences Between Importance and Presence Scales**

If differences between Presence and Importance scales are viewed as a measure of satisfaction with organizational support, then employees in the high Customer Satisfaction, Psychological Effectiveness, Team Effectiveness, Resource Utilization and Development, and Composite Effectiveness groups, are more satisfied with their Direct Supervision, Training, and Performance Appraisal systems, than individuals in the low and medium groups. In contrast, individuals in the low and medium Customer Satisfaction, Psychological Effectiveness, Team Effectiveness, Resource Utilization and Development, and Composite Effectiveness groups, were dissatisfied with each support
system studied in this research. These results suggest that employees who perceive
themselves as highly effective, tend to be more satisfied with organizational support,
particularly direct supervision, performance appraisal, and training support. Similar
results were found in Empowerment scale analyses.

In contrast, subjects' in all three groups appear least satisfied with the Group
Design, Executive Management, and Rewards scales. Compared to other Support
Systems Scales, these scales had the highest decrement (i.e., highest \( F \) ratios) between
Importance and Presence scales. These results are important, since the literature is clear
on the need for effective group design (Cohen, 1994), supportive executive management
(Mohrman et al, 1995), and group-based rewards systems (Hackman, 1987).
Additionally, the result for the Group Design scale is particularly meaningful, since
Group Design was perceived by employees to be the most important system in
performing work. Similar results were found in the Empowerment scale analyses.

Predicting Effectiveness

An additional research hypothesis concerns the relationship between Support
Systems Survey Importance and Presence scales and Effectiveness. Team effectiveness
models do not specify which types of organizational support are most related to team
effectiveness. Whereas Mohrman et al. (1995) argued that Performance Definition was
most related to effectiveness, their research appears to have been limited to performance
management systems (i.e., Defining Performance, Training, Performance Appraisal, and
Rewards). Thus, analyses were performed to determine which of the Support Systems
Survey Importance and Presence scales were most related to Effectiveness (Customer
Satisfaction, Psychological Effectiveness, Team Effectiveness, and Resource Utilization and Development.

In general, Importance and Presence scale analyses were similar—both produced complimentary results. However, for all Importance scales analyses, the Executive Manager scale appears to have served as a suppresser variable (e.g., Tabachnick & Fidell, 1996). Examination of Appendix N indicates that the Executive Manager Importance scale had very low correlations with the Customer Satisfaction scale (-.03), the Psychological Effectiveness scale (.12), the Resource Utilization and Development scale (-.01), and the Team Effectiveness scale (.08). Additionally, the Executive Manager Importance scale had very high correlations with other Importance scales, including the Group Design scale (.70), the Defining Performance scale (.80), the Information scale (.80), the Rewards scale (.67), and the Training scale (.69). Thus, it appears that the Executive Manager scale improved the predictive value of other Support Systems scales by suppressing irrelevant variance (Tabachnick & Fidell, 1996).

This result is important given the role executive managers play in team-based organizations. Mohrman et al. (1995) argued that executive management is responsible for developing and communicating organizational goals, providing the resources to develop a supportive organizational context, managing the performance of business-units, and modeling team-based norms and values. These results suggest that executive management in the current sample have significant work to perform in terms of meeting these types of responsibilities and linking these activities to team effectiveness.
In addition, when the Resource Utilization and Development and Composite Effectiveness scales were used as dependent variables, regression analyses for Importance and Presence scales were dissimilar. In this case, Importance scale analyses produced slightly different results than Presence scale analyses. These cases are noted below.

Results for the Customer Satisfaction, Psychological Effectiveness, Team Effectiveness, Resource Utilization and Development, and Composite Effectiveness scales, are discussed below.

**Customer Satisfaction Scale**

For Presence scale analyses, the Group Design and Defining Performance scales were the best predictors of the Customer Satisfaction scale. Effective group design and clear group goals are highly related to the creation of quality products, the satisfaction of customers, the development of quality services for customers, and higher responsiveness to customer needs. Importance scale analyses provide additional evidence that effective group design contributes to customer satisfaction. This suggests that organizations can best meet customer needs through the effective design of groups and by developing clear group goals.

For example, performance definition systems may facilitate customer satisfaction by ensuring that the goals of the group are aligned with customer needs. This is important, since customer requirements often change (Labovitz & Rosansky, 1997). In addition, Labovitz and Rosansky (1997) argued that organizations must create a broad understanding of customer needs within the organization. Without a shared understanding, organizational constituents will interpret customer requirements in terms
of the work currently performed. Thus, performance definition is a critical component of customer satisfaction. Groups must have a clear understanding of its mission and strategy and how this is related to customer needs (Mohrman et al., 1995).

The work team literature is also clear on methods for enhancing customer satisfaction by virtue of effective group design. For instance, groups can be designed so that they are directly accountable to internal and external customers (Lawler, 1992). However, to be accountable, teams need the internal resources and skills to effectively perform work (Cohen, 1994; Hackman, 1987). Thus, group design that facilitates work effectiveness is a critical factor in producing quality products and meeting customer needs (Hackman, 1987).

**Psychological Effectiveness Scale**

When Presence scales were used as independent variables, the Executive Management, Defining Performance, and Information scales were the best predictors of the Psychological Effectiveness scale. Supportive executive management, clear group goals, and the information necessary to perform work, are highly related to group member growth opportunities, trust in organizational leadership, organizational commitment, and job satisfaction. Importance scale analyses provide further evidence that the Defining Performance and Information scales are related to the psychological needs of group members. This suggests that organizations can best meet the needs of employees by providing supportive executive management, clear group goals, and the information necessary to perform work.
For instance, clear group goals may be related to the psychological needs of group members by clarifying organizational expectations and facilitating coordination efforts among employees. Clear organizational strategy which is communicated to organizational members and operationalized at different systematic levels of the organization, help employees understand how goals are shared between teams and other organizational constituents (Mohrman et al., 1995). Further, well-defined performance expectations can lead to employee satisfaction and can facilitate team effectiveness, by promoting groups' collective belief that the group can be effective (Pearce & Ravlin, 1987). Thus, clear group goals may be related to internal group processes, which can minimize the waste of team time, energy, and talent (Hackman, 1987).

Furthermore, information and knowledge may be related to the psychological needs of group members, since individuals may feel that they have the informational power to make decisions. Further, employees may begin to develop a sense of trust with organizational leadership, since employees are trusted with the information. For instance, effective teams have accurate and timely information, which facilitates effective decision-making (Cohen, 1994; Hackman, 1987; Pearce & Ravlin, 1987). Organizations which provide employees with the information needed to make informed decisions, facilitate employee satisfaction (Pearce & Ravlin, 1987). Information sharing is also related to the psychological satisfaction of employees, since information sharing can improve the relationship between organizational leadership and teams (Orsburn et al., 1990). By providing information to employees, organizations facilitate employees' learning and increase employees' self-confidence (Cherns, 1987).
Finally, executive manager support is a critical element in terms of satisfying employees needs. Executive managers provide goals and objects (Elden, 1994) and provide critical information to employees (Mohrman et al., 1995). Moreover, executive managers are responsible for providing the resources to develop supportive organizational contexts, which then facilitates team effectiveness (Mohrman et al., 1995). For instance, executive managers provide resources to develop reward systems (Gross, 1995), performance management systems (Mohrman et al., 1995), and information systems (Block, 1993). Thus, by developing supportive organizational contexts, executive management provide resources which facilitates employees' satisfaction with the organization.

**Team Effectiveness Scale**

For Presence scale analyses, the Group Design and Direct Supervision scales were the best predictors of the Team Effectiveness scale. Supportive supervision and effective group design appear to be highly related to Team Effectiveness scale items, including groups members who: (1) enjoy working together; (2) are satisfied with the group; (3) have good problem-solving and decision-making skills; and (4) who believe they have the ability to perform their jobs. Importance scale analyses provide further evidence that the Group Design scale is related to the ability of team members to integrate work effectively and develop effective solutions. This suggests that organizations can best develop effective internal team processes by providing teams with supportive supervision and effective group design.
For instance, group design systems enhance the internal process effectiveness of team in several ways. Group design influences the variety of inputs into the team needed for effective decision-making (Pearce & Ravlin, 1987). Appropriate selection of team members facilitate the development of job-appropriate skills, including technical, coaching, and stress management skills (May & Schwoerer, 1994). Team members with the appropriate interpersonal skills can facilitate team effectiveness, since team members can better coordinate work activities (Sundstrom et al., 1990). Teams that have the autonomy to redesign work processes, can create more efficient methods of performing work (Ledford & Lawler, 1994). Thus, group design variables can increase team members' motivation to perform tasks and the collective effort of group members to perform tasks (Hackman, 1987).

An additional method of improving internal group processes is direct supervisor support. Supervisors can teach teams critical skills, including the use of systematic decision-making processes, the development of team-based norms, and the commitment to work through differences (Mohrman et al., 1995). Supervisors influence teams' internal processes by encouraging team members to communicate, and by reinforcing team problem-solving skills (Sims & Manz, 1994). Supervisors can facilitate conflict resolution on the team (Mohrman et al., 1995) and encourage appropriate team behaviors, such as self-discipline and the motivation to create win-win resolutions (Harrington-Mackin, 1994). Finally, supervisors can develop teams' beliefs that they can succeed by providing training opportunities, developing feedback mechanisms,
encouraging the use of multiple performance measures, and supplying resources (Shea & Guzzo, 1987).

**Resource Utilization and Development Scale**

Regression analyses with the Resource Utilization and Development scale as the dependent variable, produced differing results between Importance scales as predictors and Presence scales as predictors. When the Presence scales were used as independent variables, the Group Design and Defining Performance scales were the best predictors of the Resource Utilization and Development scale. However, when the Importance scales were used as independent variables, the Rewards, Training, and Defining Performance scales were the best predictors of the Resource Utilization and Development scale.

These results suggest that when perceptions of available resources are considered, the Defining Performance and Group Design scales are the best predictors of the Resource Utilization and Development scale. However, when perceptions of important organizational support is considered, the Defining Performance, Rewards, and Training scales are the best predictors of the Resource Utilization and Development scale. One explanation for these results concerns what subjects perceive as important for Resource Utilization and Development, and what is perceived as available in the current work environment. In an ideal work environment, subjects may utilize different organizational resources in order to increase Resource Utilization and Development. The Defining Performance, Group Design, Rewards, and Training scales, and their relation to the Resource Utilization and Development scale, is discussed below.
Performance definition is related to Resource Utilization and Development Effectiveness in several ways. Performance definition helps identify measurement criteria (Gross, 1995), including innovation and productivity (Pearce & Ravlin, 1987), process improvements (Mohrman et al., 1995) and organizational criteria for effectiveness, such as costs, cycle time, and increased capacity (Shea & Guzzo, 1987). Measurement criteria can be used to identify areas where effectiveness can be increased (Gross, 1995). Measurements can also be used as a mechanism to alert group members that new skills are needed, which can improve the resources available to the team (Gross, 1995).

In addition, appropriate group design can facilitate the effective use of team resources and increase work process improvements. For instance, team members who are skilled at performing tasks and who can easily learn new skills, increase the resources available to the team (Pearce & Ravlin, 1987). Appropriate group design also facilitates task norms, so that individuals choose the most effective task strategies, and develop new task strategies to increase performance (Hackman, 1987). Finally, by giving employees the authority to fix work errors, team members can develop new team procedures and work processes (Cherns, 1987). Allowing employees to address work errors also increases the resources available to teams, since teams need the resources to correct the errors (Cherns, 1987).

In addition to other types of support, team-based rewards are a method for increasing the effectiveness of work processes and the utilization of resources. Reward systems can emphasize organizational strategies (Ledford & Lawler, 1994), such as
process improvements and the efficient use of resources. Rewards can also be linked to operational measures under the direct control of teams, such as cycle-time and costs (Gross, 1995). Thus, rewards can be linked to process improvements and efficient use of resources, which can result in cost savings and more effective ways of producing work (Gross, 1995).

Finally, training is an additional way of utilizing resources and increasing the effectiveness of team work processes. For instance, training can facilitate internal team processes, which increases the knowledge and skills available to group members, develops interaction processes that encourage the appropriate use of group members' contributions, and help weight individual members' suggestions according to their expertise (Hackman, 1987). Training can increase the knowledge, skills, and abilities of group members, and increase the ability of team members to develop new solutions and develop corrective actions (Stevens & Campion, 1994). Training can also emphasize task performance skills, which can facilitate the development and use of team resources (Mohrman et al., 1995).

Composite Effectiveness Scale

Regression analyses with the Composite Effectiveness scale as the dependent variable, produced similar results between Importance scales as predictors and Presence scales as predictors. When the Presence scales were used as independent variables, the Group Design and Defining Performance scales were the best predictors of the Composite Effectiveness scale. Similarly, when the Importance scales were used as independent variables, the Group Design, Defining Performance, and Training scales were the best
predictors of the Composite Effectiveness scale. Training was added as an additional predictor when subjects’ perceptions of available support was used to predict effectiveness. This suggests that in an ideal work environment, training would be an important component of team effectiveness. The Group Design, Defining Performance, and Training scales, and their relationship to team effectiveness, has previously been discussed.

Section Summary

In summary, comparison of Importance and Presence scales indicate that Presence scales were the best predictors of the Effectiveness scales. This result is most likely due to the way subjects responded to the Presence and Effectiveness scales: Both scales are based on subjects' perceptions of their current work environment. In addition, when Presence scales are considered alone, Group Design and Performance Definition were the most common predictors of effectiveness, except for the Psychological Effectiveness scale. For this scale, the Defining Performance, Executive Management, and Information scales were the best predictors. This suggests that compared to other types of effectiveness, different types of support are needed to meet the psychological needs of employees. Similar results were found when Importance scales were examined in terms of high, medium, and low effectiveness.

These results suggest that different types of organizational support are needed to develop and reinforce different kinds of Effectiveness. For instance, whereas the Group Design and Defining Performance scales are the most significant predictors of the Customer Satisfaction scale, the Defining Performance and Information scales are the
most significant predictors of the Psychological Effectiveness scale. Further, in an ideal work environment, different types of systems might be used to increase Effectiveness. For instance, in a model organizational context, individuals might utilize resources in the Defining Performance, Rewards, and Training systems to increase Resource Utilization and Development. In the current environment, however, individuals appear to utilize resources in the Defining Performance and Group Design systems. These patterns of results could use further research.

In any event, the Group Design and Defining Performance scales appear to be the best overall predictors of effectiveness. This is an important result, since subjects rated the Group Design and Performance Definition scales highest in terms of available support in their current work environment. Thus, organizations appear to be emphasizing systems that are the most predictive of work effectiveness. These results provide additional evidence that organizations can most directly increase team effectiveness by properly designing groups. Further, these results support Mohrman et al.'s (1995) research findings, that performance definition is highly related to team effectiveness.

Profile Analysis

An additional research question concerns multiple organizational support systems that can support effective teams. Whereas interventions on one system might produce a desired impact on a team (e.g., increased effectiveness), interventions on other systems might also produce the desired impact (Lawler et al., 1983). Other support systems, however, in combination or separately, may "compensate" for support systems that are less effective or under development. Thus, Perceived Importance and Presence of
organizational support may vary for effective teams (e.g., different teams with high levels of perceived Effectiveness).

However, analyses indicate that effective teams have similar profiles for the nine support systems (i.e., high and lows on the Support Systems Survey scales). Moreover, empowerment and effectiveness analyses tend to support this finding. Figure 19 suggests that individuals with differing levels of perceived effectiveness have similar profiles for Presence scales. Figure 17 suggests that individuals with differing levels of perceived empowerment have similar profiles for Presence scales. Figure 16 and Figure 18 provide additional evidence that groups with differing levels of empowerment and effectiveness have similar profiles.

However, the hypothesis that effective teams can have different profiles deserves further examination. For instance, results were marginally significant for the Importance scale analyses. The low number of individuals in the high effectiveness teams, however, reduced the power available for rejecting the null hypothesis (Hays, 1988), which affected the probability of finding significant profile differences. Further, only one team had a group-level Composite Effectiveness score one standard deviation above the mean. Thus, this data set may have provided a poor test of this hypothesis.

Single-Functional Versus Multi-Functional Teams and Support Systems Survey Scales

Support needs for multi-functional teams are purportedly different than support needs for single-functional teams (Klein, 1994). Analyses, however, indicate that single-functional and multi-functional teams perceive the Importance and Presence of organizational support similarly. These results are important, since the team literature
suggests that multi-functional teams have different support needs. For example, multi-functional teams have different needs in terms of integration mechanisms (Mohrman et al., 1995), training, rewards, and leadership systems (Klein & Maurer, 1995).

One possible explanation for these results is that the Presence and Importance scales were not tailored to the specific support needs of multi-functional teams. Additional research on the needs of multi-functional teams, and the selection of Support System Survey items which reflect these needs (e.g., a Multi-Functional Support Systems Scale), may provide additional evidence on organizational support for multi-functional teams.

Supervisor Style and Support Systems Surveys

An additional research question concerns the relationship of Support Systems Survey Importance and Presence scales and supervisor "style". Ray and Bronstein (1995) argued that teams can be categorized into a continuum from traditional leader-focused teams to self-led teams. Team leaders have different roles as a function of the team's ability to perform job responsibilities. Further, Sims and Manz (1994) argued that there are at least four leadership strategies, each of which has a different role in terms of interacting with employees. For instance, a "SuperLeader" style might focus on the development of internal team member capabilities, and will educate individuals on the availability and importance of resources within the organization context. Thus, differences between Importance and Presence Support Systems Surveys were assessed in terms of four team supervision styles, including: (1) an autocratic style (makes decisions,
sets goals and gives job assignments); (2) a participative style (gets employee input about decisions, goals, and job assignments, but makes final decisions); (3) a collaborative style (gets input about decisions, goals, and job assignments and makes final decisions with employees); and (4) an empowering style (allows employees to make decisions, set goals, and make job assignments). Differences between Importance and Presence scales in terms of supervision style, are discussed below.

Importance Scales

Importance scale analyses were nonsignificant. Thus, all individuals perceived the importance of organizational support similarly, regardless of leadership style. This is an important finding, since supervisors with empowering and collaborative styles seem more likely to educate team members about the broader organizational context, including the resources needed to effectively perform work (e.g., Sims & Manz, 1994). Thus, compared to the autocratic and participative supervision style groups, the empowering and collaborative supervision style groups, should probably be more knowledgeable in terms of important organizational support.

However, results suggest that individuals "look beyond" the style of their direct supervisor, and determine the importance of team-based organizational support independently--employees appear knowledgeable in terms of important organizational support. One possible implication of this finding is that employees in the autocratic and participative supervision style groups, may be more frustrated with leadership support, compared to individuals in the collaborative and empowering supervisor style groups. Employees in the autocratic and participative supervision style groups are just as aware of
the importance of organizational support compared to the collaborative and empowering supervision style groups. However, individuals in the autocratic and participative supervision style groups may receive less support from their supervisors, which may increase frustration. Thus, this supports the conceptualization of the Direct Supervisor as a contextual variable. Even in the most supportive of organizational contexts, Direct Supervision can frustrate employees' attempts to obtain needed work support.

**Presence Scales**

In contrast to Importance scale analyses, Presence scale analyses were significant for the Group Design, Defining Performance, Direct Supervisor, Training, Performance Appraisal, and Integration scales. In general, individuals with empowering and collaborative supervision styles perceived significantly higher levels of organizational support in their work environment compared to individuals with autocratic and participative supervision styles. This suggests that organizations implement additional organizational support systems to compliment collaborative and empowering leadership styles. Collaborative and empowering leaders may need additional support in order to effectively involve teams in their work.

**Importance Versus Presence Scales**

Analyses indicate that individuals in the autocratic supervisor group had a significant difference between the Direct Supervision Importance scale and its Presence scale counterpart. No additional comparisons between Importance and Presence scales were significant for the autocratic supervisor group. However, given that low numbers of individuals in this group may have reduced the probability of finding significant results
(Hays, 1988), significant differences between the Direct Supervision Importance and Presence scales seems particularly important. If differences between Importance and Presence scales are considered a measure of satisfaction, then individuals with autocratic leadership are most dissatisfied with their supervisors. As argued previously, examination of the Team Effectiveness and Psychological Effectiveness scales as a function of supervisory style may provide additional evidence for this hypothesis.

Furthermore, analyses for the participative and empowering supervision groups indicated that the Training Importance scale and its Presence scale counterpart was nonsignificantly different. Thus, subjects perceived no discrepancy between the importance of training systems and the availability of training in their work environment. Similar results were found in the empowerment and effectiveness scale analyses. This suggests that training systems are one of the most perceivable types of organizational support, or that training systems are easier to implement than other types of organizational support.

**Knowledge Development and Support Systems Survey Scales**

Purser and Pasmore (1992) hypothesized that Direct Supervision changes as a function of knowledge stage development. Thus, support systems were examined to determine if support needs change as a function of knowledge development stage. Knowledge development stages were based on Purser and Pasmore's taxonomy, which includes: (1) discovery (attempting to find knowledge and information about the project); (2) exploration (analyzing possible solutions to the problem); (3) testing (a pilot test of the solution is implemented); and (4) implementation (full scale implementation of the
solution). Nonsignificant results for both Importance and Presence scales indicate that individuals in different stages of knowledge development perceive the importance and presence of organizational support similarly. This suggests that the importance and presence of organizational support remains consistent over the different stages of knowledge development.

However, when differences between Importance and Presence scales were examined, significant results were found. If the difference between Importance and Presence scales are considered to be a measure of satisfaction with organizational support, then individuals in the exploration group are satisfied with supervisor support and training experiences, and individuals in the implementation group are satisfied with each support system except executive manager support and the rewards system. These results suggest that satisfaction with organizational support changes as a function of knowledge development.

However, low numbers of individuals in the discovery and testing groups prevent a full examination of support need changes as a function of knowledge development. A larger sample size is needed to fully explore these differences. Thus, this hypothesis needs additional examination.

Team Membership and Support Systems Survey Scales

An additional hypothesis concerns the role of organizational support in nonteam work settings. Organizational contexts are the most important determinant of team effectiveness (Mohrman et al., 1995). However, it is unclear whether this research finding extends to organizations who utilize individuals, not teams, as the basic
performing unit. Given the importance of organizational contexts to effective teams (Cohen, 1994; Hackman, 1988; Sundstrom De Meuse, & Futrell, 1990) and the role supervisors play in educating team members on team-based organizational contexts (Sims & Manz, 1994), it seems likely that team members might perceive organizational support as more important, and perceive higher levels of organizational support in their work settings, compared to nonteam members.

Analyses of the relationship between team or nonteam membership and organizational support, produced significant results for the criteria-based definition of team membership (i.e., high decision-making authority, group-based rewards, and broadly defined jobs versus low decision-making authority, individual-based rewards, and narrowly defined jobs). The organizational definition (i.e., subjects rate whether their organization considers employees to work on a team) and the individual definition (i.e., subjects rate whether they consider themselves to work on a team) produced nonsignificant results. This suggests that researchers should use stringent criteria when evaluating team or nonteam membership. Also, organizations and individuals may need education on factors that support effective teams. Results for the criteria-based definition of team or nonteam membership is discussed for Importance and Presence scales, and significant differences between Importance and Presence scales are discussed.

**Importance Scales**

Results for the criteria-based definition of team or nonteam membership produced no significant results for Importance scales. Employees view the importance of team-based organizational support similarly, regardless of team membership. These
results suggest that the systems measured by the Support Systems Survey may reflect important components of organizational contexts, even if organizations do not utilize teams.

**Presence Scales**

For Presence scales, results were significant for the Group Design scale. This suggests that compared to nonteam members, team members perceived significantly higher levels of Group Design items in their work environment, including: ability to make work related decisions, power to make work process improvements, ability to work directly with customers, a group composed of team members with important skills (e.g., technical, learning, business knowledge, and interpersonal skills), access to experts outside the team, time to set goals and make work process improvements, and the power to correct work errors. Given the importance of these factors in relationship to developing team-based work systems (e.g., Cohen, 1994; Hackman, 1987; Mohrman et al., 1995; Sims & Manz, 1994), significant results for the Group Design scale are not surprising. However, nonsignificant results for the other scales are surprising. For instance, it seems that team members would perceive higher levels of direct supervision support, than nonteam members (e.g., Sims & Manz, 1994). More stringent criteria for determining team or nonteam membership, may further describe relationships that support team and nonteam members.

**Importance Scales Versus Presence Scales**

Finally, if differences between Importance and Presence scales are considered to be a measure of satisfaction with organizational support, then all subjects were
dissatisfied with organizational support, regardless of team or nonteam membership. Furthermore, since both team and nonteam members perceived the importance of support similarly, organizations might increase employee effectiveness by implementing the systems described in this research paper.

Team Duration and Support Systems Survey Scales

Mohrman et al. (1995) argued that permanent teams can be managed through the normal organizational framework in terms of direct supervision, training, goal-setting, performance evaluation, and rewards systems, whereas temporary teams cannot. Findings in this study partially support Mohrman et al.'s results. Results are discussed for Presence and Importance scales, and then differences between Importance and Presence scales.

Presence Scales

Presence scale analyses indicate that groups with longer durations perceived higher organizational support for the Rewards, Training, Direct Supervision, and Performance Appraisal scales, but not for the Defining Performance scale. Nonsignificant differences for the Defining Performance scale as a function of team duration may be due to the way goal-setting systems were assessed. Mohrman et al. (1995) did not publish their measurement criteria for goal-setting.

In addition, significant differences as a function of team duration were found for the Group Design, Information, and Executive Manager scales. In general, teams with longer durations perceived higher levels of organizational support in their work environments than teams with shorter durations. This is consistent with Mohrman et al.'s (1995) results. Further, compared to Mohrman et al.'s results, results from this study
extend the type of organizational systems needed to support permanent teams. These additional aspects of organizational support include effective group design, information systems, executive manager support, and training systems.

**Importance Scales**

Importance scale analyses as a function of team duration revealed significant differences for the Training scale. Other Importance scales were nonsignificant. Analyses indicate that individuals in groups lasting many years perceived training as significantly more important than teams with shorter durations. One explanation for this result is that permanent teams have higher training needs, whereas individuals in temporary teams may be chosen because they have specific skill sets. For instance, permanent teams provide greater value to organizations if they can manage themselves effectively (Mohrman et al., 1995), and training is an important component for developing self-managing skills (Lawler, 1992). However, these results are meaningful, since team members did not perceive other components of organizational support as more important, than nonteam members. Team members may need education on organizational factors which increase team effectiveness. This may facilitate team members' understanding of what constitutes an effective organizational context and the mechanisms needed to develop their work environment and increase team effectiveness. Alternatively, supervisors may "buffer" team members from their organizational contexts, so that individuals are unaware of their context, since they have no direct contact.
Importance Scales Versus Presence Scales

If differences between Importance and Presence scales are viewed as a measure of satisfaction, permanent teams are less satisfied with organizational support, than teams with shorter durations. Individuals in permanent teams had significant differences between each Importance scale and its Presence scale counterpart. These results suggest that permanent teams have broader support needs than teams with shorter durations. For instance, permanent teams may be focused on tasks which require greater breadth of organizational support. Alternatively, permanent teams may become more aware of discrepancies between the organizational support they believe is important and the presence of organizational support in their work environments.

Team Tasks and Support Systems Survey Scales

Another research question concerns how perceived Importance and Presence of support systems varies depending on the service or product provided by the team. For instance, when outputs are physical, organizational informational support systems (e.g., quality, waste, or errors per hundreds) may be a critical resource to the team (Pasmore & Gurley, 1990). In knowledge creation systems, common databases and direction-setting mechanisms may be a critical resource (Mohrman et al., 1995). Team tasks were based on McDermott’s (1994) taxonomy of knowledge-work teams, including: (1) information processing (process large amounts of information; usually distant from the end customer; and heavily dependent upon computers); (2) one-on-one service providers (one-on-one encounters with customers; provide advice to meet customer needs); (3) multiple service providers (multiple individuals in the organization provide services to customers);
and (4) product development (multiple individuals in the organization develop new products; individuals work with other technical and/or service providers to create, share, and utilize ideas for solving problems or creating new services). Further, an additional label was added for production-based teams (works with tools and materials to create products; usually involves physical work; and is usually distant from the end customer).

Analyses of the Importance and Presence scales revealed no significant differences between the scales as a function of team type. This suggests that teams view the importance of organizational support, and the presence of organizational support in their work environments, similarly. These results are important, given the large amount of literature describing the differences between production-based and knowledge-based work settings, and the different needs of these settings (e.g., Mohrman et al., 1995; Pasmore, 1988; Pasmore & Gurley, 1990; Pava, 1986; Purser & Pasmore, 1992; Von Glinow, 1988). Additionally, the Support Systems Survey was primarily based on Mohrman et al.'s (1995) theoretical model of developing knowledge-based organizations. Thus, significant differences between team types would seem likely.

However, much of this literature appears to discuss redesign processes and how redesign methodology for production-based settings may not be suited for knowledge-based settings (e.g., Pava, 1986; Purser & Pasmore, 1992). Thus, there may be differences in terms of the design processes needed to implement teams in different work settings, but not organizational support differences. Note that some authors argue that redesign methodology for production-based and knowledge-based teams are similar (e.g., Fox, 1995).
When differences between Importance and Presence scales are examined, results tend to support the conclusion that production-based and knowledge-based teams have similar support needs. Individuals in production-based teams had significant differences between each Importance scale and its Presence scale counterpart. Similarly, individuals in product development teams had significant differences between each Importance scale and its Presence scale counterpart, except for the Training scale. Thus, with the exception of the Training scale, production-based and product development teams had identical discrepancies between the importance of organizational support and the presence of organizational support in their work environments. These results, in combination with insignificant differences for Importance scale analyses and Presence scale analyses, suggest that production-based teams and product development teams have similar support needs.

However, differences between Importance and Presence scales suggest differing support needs for the knowledge-based teams. Individuals in information processing and individuals in multiple service provider teams, tended to have the same pattern of differences, and fewer differences, between Importance and Presence scales. Individuals in one-on-one service provider teams and individuals in product development teams, however, tended to have more differences between Importance and Presence scales. If differences between Importance and Presence scales are considered to be a measure of satisfaction with organizational support, then knowledge-based teams have different patterns of satisfaction. This hypothesis deserves further study.
Limitations of the Study

Results of the study are limited in several ways. First, roughly half of the data came from one company. Additional data from other companies may increase the generalizability of the results in this paper. Results also come from companies that are only beginning to implement teams. Data from "mature" teams might increase the generalizability of results.

Further, low numbers in some groups (e.g., nonteam members) precluded evaluation of several hypotheses. Additional nonteam members are needed to evaluate the relationship between nonteam members and support system needs. More stringent criteria for team or nonteam membership might also facilitate the understanding of team and nonteam member support needs. In addition, these results were based on the original Support Systems Survey scales. Even though the original Support Systems Survey scales have high reliabilities, analyses on factor analyzed scales may produce differing results. Understanding of organizational support may also be further studied using more objective measures of effectiveness. Cross-validation of the regression analyses is recommended to determine how prediction equations apply to other samples. Finally, results came from a single survey. Thus, method variance may have inflated correlational results, which may have influenced findings in this study.

Implications for Further Research

Several research opportunities have already been suggested in the text of the Discussion section. For instance, there are other types of team effectiveness (e.g., withdrawal behaviors; Cohen, 1994), which are not measured by the Perception of Team...
Performance scales. These scales could use additional elaboration and research.

Research results also suggest that the Direct Supervision systems compliments, and perhaps supports, the design of effective groups. This finding deserve further research.

Additionally, organizational leadership appears to have aligned rewards systems to ensure that the needs of customers are met. However, organizational leadership has not aligned rewards systems with the other types of empowerment. The role of rewards and performance appraisal systems, and their relationship to empowerment, could use further study. Analyses also indicate that group Potency is more influenced by effective group design and clear goal-setting systems. In contrast, perception of high Autonomy, Consequences, and Meaningfulness, may depend on a larger “set” of support systems. This possibility could benefit from further research. Research suggests that high empowerment groups require specific types of support. The high Potency groups require Direct Supervision and Performance Appraisal support; high Meaningfulness groups require Direct Supervision support; high Consequences groups require Direct Supervision, Training, and Performance Appraisal support; and high Composite Effectiveness groups require Direct Supervision and Performance Appraisal support. Additional research is needed to evaluate this research finding.

Low numbers of individuals in the discovery and testing groups prevent a full examination of support need changes as a function of knowledge development. A larger sample size is needed to fully explore these differences. Furthermore, low numbers of nonteam members prevented evaluation of several hypotheses. More stringent requirements for team membership might also influence results.
Research findings also suggest that knowledge-based teams have different patterns of satisfaction with organizational support, which deserves further study. Components of support systems and how they are aligned to produce certain kinds of effectiveness, could use further research. For instance, do certain types of effectiveness create demands on certain support systems compared to other support systems?

The Empowerment scales could be further explored by using Importance and Presence scales as predictors, and the Empowerment scales as dependent variables. This might provide further evidence on the relationship between organizational support and Empowerment.

Finally, Importance scores and Presence scores could be subtracted to create a difference score. The difference between Important and Presence scores might be viewed as a measure of satisfaction with organizational support. In this case, almost all of the analyses in this research study could be reproduced using Satisfaction scale scores.
APPENDIX A

ADAPTED VERSION OF BEYERLEIN’S (1996) PERCEPTION OF TEAM PERFORMANCE SCALE
Directions: Rate your work group on the basis of the following: If 100% means the best that you group can do with all its current resources, how well is it actually doing now (write a percentage ranging from 0% to 100% on the line after each statement).

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<tbody>
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<td>1</td>
<td>Controlling costs:</td>
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<td>2</td>
<td>Goal achievement:</td>
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<td>3</td>
<td>Cycle time:</td>
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<td>Quality of products:</td>
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<td>Innovation:</td>
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<td>Increased capacity:</td>
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<td>Use of expertise on the team:</td>
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<td>Customer satisfaction:</td>
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<td>Quality of service to customers:</td>
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<td>Responsiveness to customer requirements:</td>
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<tr>
<td>11</td>
<td>Desire to work with the team in the future:</td>
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<td>12</td>
<td>I am more satisfied with the team than frustrated:</td>
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<td>13</td>
<td>Problem-solving:</td>
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<td>14</td>
<td>Decision-making:</td>
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<tr>
<td>15</td>
<td>We believe in our ability to perform our job:</td>
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<td>16</td>
<td>Increased sales:</td>
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<td>17</td>
<td>Your growth opportunities:</td>
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<td>18</td>
<td>Trust in management:</td>
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<td>19</td>
<td>Commitment to the organization:</td>
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</table>
Satisfaction with the job:_________
APPENDIX B

KIRKMAN AND ROSEN’S (1996) TEAM EMPOWERMENT SCALE
Directions. The statements below ask you about YOUR TEAM AS A WHOLE, NOT YOU THE INDIVIDUAL. Please think carefully about the extent to which you AGREE or DISAGREE with the following statements concerning the FEELINGS, ABILITIES, AND ACCOMPLISHMENTS of your work team.

My team:

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<tr>
<th>My team</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Neither</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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</table>

1. has confidence in itself
2. believes it can be extremely good at producing high-quality work
3. expects to be known as a high performing team
4. feels it can solve any problem that comes up
5. believes it can be very productive
6. can get a lot done when it works hard
7. believes that no job is too tough
8. expects to have a lot of influence around here
9. cares about what it does
10. believes that its work is valuable
11. believes that its projects are significant
12. feels that its group purpose is important
13. finds that what we are trying to do is meaningful
14 feels that its group tasks are worthwhile
1  2  3  4  5  6  7
15 can select different ways to do its work
1  2  3  4  5  6  7
16 determines as a team how things are done
1  2  3  4  5  6  7
17 feels a sense of freedom in what it does
1  2  3  4  5  6  7
18 determines as a team what things are done
1  2  3  4  5  6  7
19 makes its own choices without being told by management
1  2  3  4  5  6  7
20 has a lot of choice in what it does
1  2  3  4  5  6  7
21 makes good progress on its projects
1  2  3  4  5  6  7
22 has a positive impact on other employees that depend on it
1  2  3  4  5  6  7
23 has a positive impact on this company's customers
1  2  3  4  5  6  7
24 accomplishes its objectives
1  2  3  4  5  6  7
25 performs tasks that matter to this company
1  2  3  4  5  6  7
26 makes a difference in this organization
1  2  3  4  5  6  7
APPENDIX C

SUPPORT SYSTEM CATEGORY SUMMARIES
Defining Performance

Direction in Team-Based Organizations

A broadly held knowledge of where the organization is going. A broadly available strategy for getting there. Criteria and priorities of the organizational-wide strategy. The translation of broad direction into more specific, local goals.

Components of Goal Alignment

Identification of the business process to which the worker contributes. Identification of business process elements, such as outputs, customers, and customer requirements. Goal alignment includes "ownership" of long-term business goals by workers and consequences when goals are not achieved.

General Principles For Performance Definition

Ensure a vertical fit to the larger organizational system. Develop a lateral performance fit congruent with vertical performance fit (e.g., performance is determined in collaboration with co-performers -- teams with interdependent teams, co-workers with co-workers, and business-unit with business-unit). Develop performance parameters which do not overextend the performer (e.g., an individual involves team members in explaining the individual's total performance commitments). Provide key stakeholders a prominent role in defining performance. Allow performers a role in defining their own performance.

A Model For Designing Team-Level Performance

Performance is defined (e.g., goals, objectives, metrics, and resources) with the input of key stakeholders (e.g., other teams, customers, and business-management), the
most important of which is the team's business-unit. Performance is determined in the context of the overall direction of the organization with help from business-unit management. Teams determine how to accomplish its performance requirements. Goals and metrics are determined collaboratively with the team and the business-unit.

A model for designing individual performance

The individual is involved in the team planning process. An individual's contribution to the team is determined in conjunction with other team members. Individual performance roles are integrated into an overall performance definition for the team. All team members are aware of other team member performance commitments. Processes are in place so that performance definition does not become overly burdensome or seen as an unneeded administrative burden. An adequate amount of time is spent defining performance.

A General Model For Defining Performance In Team-Based Organizations

Define performance at all levels, not just the individual level. Define the general direction and role of the performer (for business units, direction is established by developing mission and strategy). Identify the needs of key stakeholders (e.g., business managers, customers, and co-performers). Determine outputs resulting from performance and the tasks needed to produce these outputs. Determine goals and objectives for stakeholders and the different levels above the performer, and task performance goals for the performer and different levels. Establish applicable metrics. Determine how the work will be performed and organized. Determine the resources, tools, and skills needed by performers to reach their performance objectives. Define specific aspects of
performance and performance measures from the onset. Include individuals, teams, business-units, when setting organizational strategies and goals.

Goals Must be Agreed Upon

Ensure goals are agreed upon. Allow teams to set goals collaboratively. Must create shared goals. Must create shared criteria for meeting goals. Teams should set goals collaboratively. Allow teams to set goals meeting the overall strategy of the organization and their business unit. Allow individuals to define and if necessary, modify an organizational mission. Provide challenging objectives and reinforce the achievements of the team. Ensure goals require high levels of performance.

Goals Should Orient Team Members

Facilitate decision-making skills by orienting team members to the needs and demands of the team. Ensure the strategic goals of the organization are clear to organizational members. Determine a clear organizational strategy (what the organization is trying to accomplish). Insufficient clarity or nonexistent procedures for completing projects. The organization must develop values that have significant meaning for all its members and that guide individuals during times of uncertainty. Information about tasks, including dates on task completion, production rates, and quality levels. Must determine the primary task of workers. Insufficient clarity in goals or priorities when completing projects.

Goal Alignment

Must pay special attention to the needs of knowledge workers, and must use interpersonal skills when evaluating and aligning the work of knowledge workers with
organizational needs and priorities. Check for goal continuity both horizontally and vertically (e.g., cross-functional management teams. Align organizational, business-unit, team, and individual goals. Link organizational strategy with trade-offs. Link organizational strategy with business-unit and team strategies. Vertically align goals (overall organizational strategy is translated into goals at the business-unit level and team goals are nested under business-unit goals. Horizontally align goals (business-unit goals are aligned with other business-unit goals in order to meet organizational goals, and team goals are aligned with other team goals within a business-unit or between teams in other business-units, to meet business-unit goals and organizational goals. Goal alignment must be negotiated between parties given the current organizational resources and requirements. Reduce the extent to which actions are affected by individuals with different goals. Ensure that goals are appropriately defined and selected. Facilitate the structuring of team and business-unit goals in order to reach organizational goals. Translate organizational goals into team goals. Develop an appropriate organizational strategic planning process. Provide strategies for meeting goals

Goals Must be Clear

Clear group goals. Clear goals and priorities for the team. Clear goals and priorities for individuals. Must identify group outcomes. Must set priorities and goals for collaborative work systems. Direction setting. Must determine critical processes for organizational survival. Mission clarity is important. Provide teams criteria and priorities for implementing strategies. Provide direction for teams by giving broad knowledge of organizational goals. Appropriate expectations refers to well-defined team
performance expectations and to expectations that the team can succeed. Provide clear expectations on team performance.

Conflict and Trade-Offs

Trade-off mechanisms. Conflict resolution mechanisms. Help to solve conflicting goals and priorities. Must address conflicts in the system. Must determine priorities and goals in the input-conversion-output process. The goals of knowledge workers (McDermott, 1995) and the many alternatives available for project completion, produce conflict. Must determine when and how goals and priorities should change. Must determine priorities. Tradeoff making mechanisms. Must make trade-offs when conflicts occur between competing priorities.

What Is Considered in Setting Goals

Organizations must adapt to their environments and organizational elements must adapt to their environments and other organizational elements. Changes in the organization should be continually made to meet environmental demands. The organization must be designed to fit its goals. Conflicts which may occur between the system and the environment if different parts of the system define the primary task differently. The points at which systems must interact with the environment in order to survive. The concept of the primary task. Critical processes necessary for organizational survival. The dominant import-conversion-export cycle. Use current organizational resources and requirements to facilitator collaborative goal setting. Governmental systems. Economics systems. Cultural systems. Technological systems. Transportation systems. Trade and monetary systems. The environment must be taken into account so
that key technologies are buffered from environmental trends that might threaten the organization's survival. Must help work systems identify key points at which the system must interact with the environment in order to survive. Determine what resources are necessary and are available for meeting group goals. Must monitor environmental turbulence, trends, and customer needs. Uncertainty. Change. Inattention to customer needs or external organizational demands when completing projects. Identify and apply resources to reach the organizational mission. Identify the necessary tasks to meet organizations strategy.

Must Plan for Changing Goals

Ensure organizational members are alerted if goals and strategies change.

Planning systems.

**Performance Review**

**Performance Review Design**

Evaluate performance at different levels (e.g., organization level, business-unit level, team level, and lateral team level). Includes self-reviews by teams, peer reviews, co-performing team reviews, reviews by managers, and customer reviews. Does not overemphasize any one level of review (e.g., customer performance evaluations over business-unit evaluations). Frequent performance reviews. Evaluates performance under the control of the performer. Determines if performance definitions are appropriate. Identifies additional developmental needs. Yearly reviews are summaries of more frequent reviews.
What to Review (Measurement)

Revenue. Use measurable goals (e.g. cost, quality, scheduling, revenue, profit, reuse of equipment and software, the percentage of revenue from new products and/or new customers, and achieving a percentage of orders from new customers.

Micro-measurements (e.g., errors per hundreds, waste, or quality). Problem-solving.

Decision-making. Work performance. Task performance. Satisfaction. With the team. Measure the social processes upon the ability of the group to work together on future tasks. Assess how groups satisfy the experiences of individual group members. With the work. Compensation system. Evaluation system. Advancement. Workload. Serving customers. Meeting customer needs. Help group's measure their performance in terms of customer expectations. The degree to which performance meets the needs of key stakeholders. Determine the degree to which performance meets the needs of the larger system (e.g, team, business-unit, or organizational level). Determine the organizational value of performance. The extent to which performance progressed from baseline measures to goal attainment. Determine the skills and resources of the performer.

Performance deficits in the performer or situation which can then be addressed through performance development. The extent to which the work was organized and carried out by the performer.

Important Aspects of Measurement

Develop dependable measurement systems. Ensure performance measurement systems are agreed upon by all parties. Evaluation criteria that meet the needs of individual knowledge workers. Attempt to use multiple, comprehensive, performance
measures because less comprehensive measure may produce confusion on goals and expectations. Evaluating the performance of knowledge workers is not always possible.

Who to Review

Develop a system of feedback for goal attainment at the business-unit and team level (ensures all levels are accountable for meeting organizational goals). Provide feedback at the team and individual level.

How to Review

Self-rated performance. From multiple perspectives. From other departments or work units.

Ensure Reviews Are

Descriptive rather than judging. Specific. Timed correctly. Takes into accounts individual needs. Complemented by alternative behaviors. Clearly understood. Is checked to ensure its accuracy. Be sensitive to the work cycles of teams (e.g., longer or shorter work cycles). Encourage trust and respect between the team and management. Ensure agreement about the timing, procedures, and goals of the performance review. Ensure well-defined objectives for teams and individual. Develop feedback systems which provide opportunities for informal reviews, coaching, and assessment. Provide open and dynamic information exchanges during feedback reviews. Ensure performance recognition methods are considerate and appropriate. Use knowledgeable and trustworthy individuals to evaluate and provide feedback. People often resist having their work evaluated by anyone other than similarly skilled professionals management.

Encourage collaboration between performers and evaluators. Provide evaluators
information about the evaluated work and the interests and goals of the performer. Ensure evaluators make comments relevant to the work. Provide evaluators previous evaluations of the performer. Provide evaluations at critical stages of work. Ensure evaluators provide information of deviation from goals and steps needed to return to goals. Instruct evaluators to describe strengths and weaknesses of the performer's work. Ensure evaluators provide encouragement. Regular and accurate feedback on task performance (task feedback). Sensitivity and appropriateness of performance criteria. Feedback mechanisms that meet the needs of knowledge workers. Developing appropriate performance appraisal systems.

Outcomes of Performance Review

Develop action plans from feedback. Utilize performance feedback as a planning mechanism. The direction of performance and if direction has changed so that performers can be directed to new goals or to original goals. If performance definition was valid or needs modification.

Group Design

Team Design Goals

Contains the resources needed to perform self-management functions. Develop and implement teams complementing internal organizational functions that address external environmental needs. Organizational members with task interdependencies can collectively process information and make decisions. Multiple perspectives are considered when complex trade-offs or deliberations are made on issues. Ensure team
design facilitates achievement of business-unit and organizational goals. Processes that provide value to customers are integrated.

Team Environment

Co-location of team members. Co-locating team members increases face to face communication and creates a “symbolic” value, since teams can develop team-based norms that are signified by the physical space of the team. Physical environment that offers team members face to face communication. Working in public allows team members to share unfinished ideas, discuss incomplete results, and to participate in deliberations. Team space that is “owned” by the team. Provide team members a physical work area that is private. Provide reception and conference rooms for teams. A physical environment that minimizes stress-producing distractions and interruptions successful team experiences.

Team Member Selection

Allow teams to have input when choosing team members. Minimize turnover in groups composed of skilled specialists. Promote compatibility between team members, particularly of long-term teams.

Individual Level Characteristics

Has needed technical skills. Match job uncertainty and complexity with team member's skills. Includes individuals with the necessary abilities. Choose team members appropriate to the purpose of the group. Individuals that can learn job-appropriate skills via training. Select individuals with the ability to understand diverse technical competencies. Dedicated to teaming concept. Choose group members who regard
autonomy as a positive outcome. Choose organizational members for teams who view increased autonomy as a positive outcome. Select individuals dedicated to work within the boundaries of the group. Team members with the social skills to listen, understand other perspectives, constructively solve conflict, and make good decisions would seem more likely to effectively transform informational inputs into useful knowledge.

Individuals who can openly communicate of ideas. Select individual possessing good learning skills and leadership skills. Individuals that can model teaming behaviors. team members or managers that can offer verbal encouragement. Team members' that can interpret stressful experiences positively. Select team members who can provide appropriate coaching skills and that can train team members to acquire coaching skills. Selects individuals with the ability to develop interpersonal and conflict resolution skills.

**Group Level Characteristics**

Team composition that matches the task complexity with group member's skills.

Adequate skills. Ensure groups have group membership with the appropriate skills and knowledge. Includes the necessary knowledge and skills for effective task performance. Individuals with knowledge and skills necessary for task completion should be included on a team, or, individuals with power over areas or in certain areas might be included on a team to ensure that their "buy-in" is obtained. Includes the necessary knowledge and skills but minimizes status differences. Collective effort of group members to perform tasks. Group members have the knowledge and skills to perform tasks. The team includes team members with the collective skills necessary to meet task demands. Ensure groups initially have needed technical skills. Needed skills and abilities of organizational
members to perform many internal and external boundary demands. Job tenure.

Minimizes interpersonal issues. Ensure groups initially have needed interpersonal skills.

Group members have the needed interpersonal skills. Groups are neither too homogeneous or too heterogeneous in terms of membership diversity. Provide heterogeneous group membership and increase the diversity of perspectives available to a group. Members are similar on some characteristics but have different levels of general and functional experience appropriate to the interdependence needs of the team. Decrease within-group status differences. Low interpersonal conflict. Has experience with organization:

Organizational tenure. Group design that includes individuals with appropriate organizational experience in the group. Group size is appropriate. Ensure team is of an appropriate size. Size. Ensure groups are not overly large. Ensure the group size is appropriate to the task. Ensure teams are not overly large. Team design that ensures an appropriate group size. Structure team size so decision-making is facilitated.

Boundary Management

Boundary management (interdependencies with groups on "daily" basis and interdependencies with groups on a project basis). Coordination and integration needs. Help teams manage demands placed upon the boundary of the team. Task management.

Need power over tasks. Power refers to the ability of employees to act and make decisions about all aspects of work processes. Allow group members autonomy over work processes. Task control. The ability of the team to make decisions about work process after inputs are received. Allows team members to determine work processes after inputs are received. Allow technological and social systems to change to work
conditions. Provide employees power to act and make decisions about their work processes. Facilitate a team's ability to invent and implement modifications to their tasks which increase task performance.

Task Management Functions


Performance Management

Goal setting. Determining objectives. Determine priorities. Performance review. Self-rated performance on: Problem-solving, decision-making, work performance, satisfaction (with the team and with the work), compensation system, evaluation system, advancement, workload, with serving customers and meeting customer needs. Track costs and profits, revenue, responsibility for monitoring output quality and modifying processes to increase quality, reviewing the performance of the teams and individuals. Determining methods to improve performance. Allocating and determining rewards.
External Boundaries

Coordination of inputs and output with stakeholders within and external to the organization. Development of mutually beneficial processes and mechanisms for interfaces between stakeholders. Redesign of processes to improve their effectiveness.

Integration Functions

Task interdependencies. Task interdependence. Outcome interdependence.

Task and outcome interdependence should be aligned or group members should have the opportunity to perform work independently. Task information-processing demands. Ensure team members integrate their work, not managers. Help teams coordinate (e.g., interdependencies) different tasks, structures, processes, and cognitive and emotional orientations due to differentiation processes.

Task Characteristics Appropriate For Teams

Appropriate tasks for teams. Develop motivating jobs via Hackman and Oldham's (1980) criteria -- task variety, task identity, task significance, task autonomy, and task feedback. Design work tasks so they are viewed positively by others inside and outside the organization (task significance). Tasks which are important to the organization and customer. Design jobs so that employees perform a whole and identifiable task and that allows group members to view work outcomes (task identity). Tasks which include whole and meaningful work. Increase motivation by providing groups a meaningful and whole piece of work. Provide groups discretion and independence when determining work processes and scheduling work (task autonomy). Tasks which allow group members autonomy. Design team around a meaningful and
whole work process. A task that is meaningful or "whole" at the level of the team --
tasks which are overly large or small are inappropriate for teams. Systems should be
designed around whole pieces of recognizable tasks. Task design/technology.

Variety of Different Job Functions

Allow for cross-training. The extent to which interdependencies among workers
provide for the accomplishment of a task or the continuity of a task if an individual in the
social system should fail. Allow members to cross-train or that facilitates the ability of
team members to understand and discuss other job functions. Redundancy of functions in
that individuals and groups of individuals possess a wide repertoire of skills that increase
the ability of the organization to remain flexible.

Motivating Tasks Requiring High-Level Skills

Task design so that individuals are motivated to perform effectively. Design
tasks requiring high levels of skills among employees. Challenging tasks. Tasks which
require high-level skills. Tasks can be redesigned. Develop tasks amenable to
modification. Tasks allow for regular feedback. Provide immediate and direct feedback.
Tasks which allow group members regular feedback.

Tasks Require High-Levels of Integration

Design tasks requiring high levels of interaction among employees. Work roles
should be organized so that work is performed cooperatively and not competitively. The
design of team tasks so that team members interact. Structure the group so that jobs are
interdependent and rewards are distributed dependent on group performance. Safe tasks.
A job structure that minimizes physical and psychological risks. Identify the technology and social components that turn inputs into outputs.

Tasks That Reduce Uncertainty

Team design that minimizes team member's job uncertainty. Team design that provides team with incrementally difficult job tasks so that teams can gain experience and efficacy over time. Work roles should be organized so that a worker can identify an end result as their responsibility or the responsibility of another worker. Set a clear charter that helps groups know what success looks like and that helps groups define their goals and focus on the group's interdependence.

Tasks Allowing Feedback

A mentoring system that trains experienced team members to give credible support and encouragement to peers. Tasks which allow autonomy. Teams should be able to redesign processes. Need oversight of redesign process. Develop systems which oversee and coordinate needed redesign efforts.

Need Resources

Developing resources, such as time and budgets, to redesign work processes. Ability to influence leadership higher in the organization. Need support for redesign. Develop high level organizational support of redesign and continuous improvement. Develop managerial commitment to redesign and continuous improvement.

Task Redesign

Performance strategies are appropriate for task performance. Address task contingencies and the level of strategy needed to meet desired outcomes. Determine
human constraints on a system (e.g., which individual has knowledge necessary for project completion). Standardized work processes (e.g., similar methods of performing work) are most valuable when processes are utilized over successive work cycles. Standardization of work content (e.g., standardized parts or standardized component interfaces) takes systematic processes to an additional level, because standardized components increase the ability of team members to fit work together. Eliminate nonvalue added work. Identifying areas that can be developed simultaneously.

Systematic key processes and standardized project management tools can provide team members the information they need and a clear indication of their interdependencies. The ability of a system to maintain its order or complexity while performing work and interacting with its environment (steady state). Support norms of creativity and collaboration. Identification of individuals who might be included in forums for deliberating.

**Decision-Making**

Involve needed individuals in key deliberations. Decisions are often made by intuition, since little information exists, which makes time parameters for project completion impossible to predict. Decision-making mechanisms. Methods for decision-making and response that allow the system to choose and make corrective actions before the source of the disturbance changes. Decision-making systems that signal when the exploration might end. Workers jointly determine how support services should be allocated, or support services are provided in a fair manner to all workers. Team design that clarifies decision-making responsibilities.
Information

Identify individuals with important information. Identify other influential individuals who have important knowledge and can influence knowledge work projects.

Variances

Variances should be addressed as near as possible to the point of origin fewer levels of supervision and control are needed, and it is possible to allow individuals more complete jobs, since they need the resources necessary to reduce variances. Variances should be controlled, as much as possible, at their source.

Redesign Philosophy

No more should be specified in a job design than is absolutely necessary. It is important to specify in a job design only that which is essential to performing the job. Team design that facilitates attainment of individual, team, business-unit, and organizational goals. Redesign process should be seen as a vehicle of transition and accompanied by new values and new methods of leadership. As soon as redesign is completed and implemented, the consequences of the redesign will indicate the need for redesign. Internal constraints develop because completion of a primary task may depend more upon a system's technical or social components. Concrete boundaries arise from the physical and temporal aspects of a concrete object. Conceptual boundaries are used to abstractly differentiate an attribute of a concrete system. Adjustment processes in the system's components which counter environmental disruptions through adaptive mechanisms, and which restore the system, as much as is possible, to the preexisting state. Maintaining a balance between internal components and the environment operates
Information System

Information can refer to Different Organizational Aspects


Goals of Information Systems


Important Aspects of Information Systems

Information systems that provide information meeting the team's level of autonomy and decision-making power. Information systems that are accessible by team members

Norms that permit the use of mechanisms that seek and acquire knowledge. The development of information systems that select appropriate teams as role models. Should be specialized but be common (similar structure and accessible) to different organizational constituents. In the case of knowledge work, the systems would have to be specialized for developing, creating, storing, and accessing knowledge. Common databases so that information input and retrieval are facilitated. Mechanisms that share learning between team members and other teams. Information systems should be developed so that information is available to those that need it. Boundaries should not be inserted that interrupt or "loop" information and produce obstacles. Information loops that act as control by top management often result in intervention by managers.

Information for recording is essential but also has the potential of being abused and
should only be used when needed. Mechanisms which provide knowledge workers access to information internally and externally. Information for action should be available first to those who are required to act.

Information on Work Processes and Tasks

Need continuous flow of information between specialties. Information sharing is a key method of inviting knowledge workers into each other's territories. Information to teams such as goal achievement, cost, waste, quality, project status, schedules, and new orders. Systems that provide timely feedback on job performance. Knowledge includes knowledge about how the work is performed, knowledge about the business, and knowledge about the complete work systems. Must provide employees knowledge on completion of tasks, knowledge about the business, and knowledge about the complete work systems. Must increase employee understanding of organizational work processes, business economics, technical skills (e.g., skills to help employees understand organizational needs and that allow meaningfully participation in decision-making), and that provide proof concerning the organizations commitment to their development. Must provide information on requirements and constraints in performing tasks. Information systems that provide the parameters of the performance situation. Information on

Strategies, Goals, Roles, and Priorities

Information resources needed to meet individual, team, business-unit, and organizational objectives -- need systems which provides information clarifying individual, team, and business-unit roles in the organization (e.g., priorities and goals); need mechanisms for sharing goals and priorities. Information needed to set
organizational strategies and goals. Must share the criteria and priorities of the organizational-wide strategy and that translate broad direction into more specific, local goals. Store existing group strategies. Store consequences of different task performance strategies. Key information must be shared and prioritized. Mechanisms that help prioritize and share key information. Mechanisms for sharing goals and priorities when they change.

Information on Knowledge and Expertise

Must facilitate the communication of knowledge and expertise on teams. Teams need adequate information to make informed decisions. Shared learnings. Systems that provide the necessary information for good decision-making. Must provide information on factors affecting group effectiveness and performance (e.g., group interaction of a depressed economy). Information systems that facilitate the seeking of knowledge.

Information systems that facilitate the acquisition of knowledge.

Information for Decision-Making

Information systems that provide decision-making tools. Information systems that facilitate choosing the best alternative for solving problems. Information systems that provide information processing tools that group data and compare and evaluate alternatives. Must provide information (priorities and goals) concerning how a possible solution might be evaluated. Identification of key information. Information systems that provide the availability of material resources. Information systems that provide customers and their needs. Mechanisms that share information between an organization's environment and its teams. Mechanisms which help knowledge workers determine
whether the environment is analyzable, discoverable, or unanalyzable so that different information interpretation strategies can be utilized. Information about the team’s environment, so that team members have accurate performance attributions. Whether the organization views the environment as analyzable or unanalyzable. Whether the organization seeks information from the environment or passively accepts environmental information. Communication mechanisms that inform individuals responsible for implementing knowledge about results from deliberations. Information systems that capture the information and learnings from deliberation. Identification of deliberation topics. Mechanisms to make learning available to other organizational systems and that support and reward transfer of learning between systems. Must create individualized career development opportunities. Must develop "career-sensitive" human resource systems

Integration Systems

Integration is embedded in complimentary, overlapping systems. Reward systems that emphasize task-oriented collaboration. Educational systems that provide training or technical assistance when groups do not possess the needed knowledge, skills, or experience for performing work. Training that is available when groups need assistance. Systems that provide information necessary for the development of task- or situation-appropriate strategies and selection of strategies. Must ensure that different types of integration mechanisms (voluntary, formal, or integrator roles) complement one another. Must integrate reward systems, planning processes and informational systems (i.e., the reward system is based on goals determined by the planning process and the
planning process depends upon an information system to acquire data to make plans). Must use appropriate integration mechanisms (voluntary, formal, or integrator roles) between interdependencies. Formal reporting relationships. Informal reporting relationships (e.g., to report new information or maintain functional expertise.

Integration Roles

Integration role selection procedures that choose individuals with the appropriate skills and abilities. Ensure that integrators have knowledge of the integrated departments, technical knowledge, the ability to influence individuals without the use of authority, can influence without authority, low ego needs and high interpersonal skills, a broad-based background, so that he or she may translate between areas of expertise when the functional diversity of team members is high, team members must accept the authority of their peers when performing integration functions.

Must match integrators with the influence and power needed (e.g., large differences between units may require more influence and power), since the power and influence needed depends on the context of the integration role. Must provide integrators additional power bases that augment their influence and power (e.g., structure, staffing, status, information systems, planning processes, reward systems, responsibilities, and budgets). Must ensure that integrators report to the correct (e.g., the general manager) individuals. Must ensure that integrators have the needed status (e.g., appoint high-status individuals to the role). Must develop power bases for integrator roles by assigning responsibilities (e.g., assigning budget responsibilities to integrators), thus making the
integrator role clear and legitimate. Can give budgeting power to integrators, so that he or she can ensure coordination and integration by influencing organizational constituents.

Leadership Integrating Roles

Develop leadership integrating roles when team self-containment (e.g., interdependencies lie within the boundaries of the team) is low, facilitate decision-making, integrate the work of teams members, manage team boundaries, when the team is easily affected by change, address technical difficulties or successes, address strategic changes, inform workers of organizational priorities and goals, address resource allocation changes, competitive surprises such as changes in missions or task execution strategies, buffer team members from unpredictable environments, when the technical skills and experience of team members is low, provide direct leadership, training, boundary management, when the life span of a team is short, provide coordination and leadership when self-management skills are not present, when information-processing needs and task complexity exceed the capacity for informal methods of handling the information, when teams have high amounts of information uncertainty, need leadership roles to handle integration needs, when interdependence needs between team members is high, integrate and coordinate concerns and issues, track unresolved issues, facilitate meetings, ensure key players are involved in decisions, contribute technical information to the team, when the size of the team is large, track necessary interactions, ensure all points of view are considered, develop plans for team members, coordinate between team members.
Integration Via Information

Must communicate business information (e.g., business-unit members have information to make trade-offs, including business strategy, business goals, and progress toward goals. Need integrated information systems (e.g., shared knowledge on project costs, profits, scheduling, and goals). Must ensure information systems are consistent across the organization, between companies (if necessary), and that allow individuals to integrate databases. Shared databases (e.g., database information on customers, products, quality levels, production levels, cost, and knowledge. Can ensure informational integration through the development of information technology networks such as personnel databases and communication links among functions or interdependent functions. A team design that balances the individualized needs of teams with the information sharing needs between teams. Shared information vertically and laterally within the organization. Norms for sharing information laterally (e.g., what information to include and when information should be distributed. Can ensure informational integration through the physically co-location of important roles

Role Rotation

Can ensure informational integration through interdepartmental rotation between important roles. Can ensure informational integration through interdepartmental events, such as training and team building with other functional departments. Can ensure informational integration through mirror-image departments (i.e., functions are arranged so that each function presents one interface to other functions so that individuals do not have to communicate with vast numbers of departments when relying key information.
Can ensure informational integration through consistent reward and measurement systems. Must ensure planning processes complement organizational integration. Must ensure planning processes are based on valid data and involve key personnel to facilitate resolution of conflicts, trade-offs, and goal alignment. Must ensure reward systems integrate organizational constituents by rewarding planned outcomes. Shared goals.

Decision-making procedures that ensure the appropriate parties are included. Systematic and timely decision-making processes. Clear decision-making authority.

Integration Through Organizational and Team Design

Organizational design that minimizes the coexistence of teams within hierarchical, functional structures. Ensure complex tasks include key players in teams to handle interdependencies between functions or areas. Routinize simple interdependencies through the use of specifications or procedures. Regulate more complex and reciprocal interdependencies through formal and informal integration and conflict resolution mechanisms. Determine where task interdependencies interrelate so that group tasks fit together. Create managerial roles, when necessary, to link teams with the broader organizational strategy. Use cross-functional management teams. Help cross-functional management teams develop a shared understanding. What goals the organization is trying to accomplish. How the organization will accomplish its goals. How people with different knowledge bases will integrate perspectives. How business-unit goals and activities are aligned with organizational strategy. Facilitate integration of business-unit and team strategies and the allocation of resources (e.g., cross-functional management teams. Develop mechanisms that help set and
communicate corporate strategy and goals (e.g., design a process so that there are shared understandings of the strategy and the alignment of goals across various units of the organization. Link organizational members with task interdependencies so they can collectively process information and make decisions. Ensure processes that provide value to customers are integrated. Facilitate integration between team tasks. Allow frequent interactions between teams. Standardize procedures and products between teams. Integrate teams with different work cycles (e.g., whereas a production-based team may require close external synchronization, teams with longer work cycles may have lower external integration needs). Help teams synchronize work with other work units. Ensure members efforts are not wasted. Ensure coordination mechanisms are explicit and obvious to group members. Coordinate activities between interdependent groups. Increase the ability of teams to coordinate efforts without duplication or wasted effort. Manage short-term and long-term groups through the organization’s business and performance management processes. Use multi-functional teams -- bring individuals from different organizational functions together.

Ensure management can influence organizational strategy and goals (e.g., make executive management aware of business unit’s technical and market situation through some type of upward process). Involve managers in allocating resources between business units. Involve managers in allocating shared resources between business units. Involve managers in making high level trade-offs among competing preferences that cannot be resolved laterally at lower levels. Align support service goals with team and business-unit needs. Develop service contracts between support services and teams so
that the goals of shared services incorporate the needs of different teams. Develop conditions so that goals and rewards are interdependent between service providers, teams, and business-units. Organizational decision-making charts (e.g., who should be included in decision-making, who has decision-making authority, and who should be informed of decisions. Procedures for specifying how decisions are made. Procedures for specifying decision-making steps. Procedures for clarifying what data is included in decision-making. Procedures for specifying which parties are included in decision-making. Team design that minimizes distribution of decision-making power between teams and managers. Clear decision-making power. Norms for decision-making time frames. Procedures for including the appropriate parties in decision-making. Internal team integration mechanisms that minimize time spent in meetings. Similar processes between teams (e.g., similar computer systems, databases, escalation paths, decision-making processes. Team design that promotes self-containment -- team members are responsible for an identifiable and substantial piece of work and team members depend minimally on individuals outside its boundaries to perform tasks. Team design that minimizes external (i.e., external to the team) integration required to performing tasks. Grant teams as many self-management responsibilities as possible. Involve team members in determining leadership roles and other self-management choices. Develop lateral mechanisms for integrating between teams and business units. Creating management roles when necessary to link the team across organizational boundaries (e.g., determining strategies, priorities, or allocation of resources).
Clearly specified decision-making escalation paths. Clear mechanisms for resolving trade-offs. Clear norms for using escalation paths. The understanding that use of escalation paths does not mean failure. Continued ownership of the problem when escalation paths are used. A collaborative structure for escalation paths so that teams learn to make their own trade-offs in the future. Mechanisms that align organizational strategies with tasks. Mechanisms that align organizational structures with task demands. Mechanisms that align organizational objectives, task demands, and the developmental needs of individuals who perform tasks. Mechanisms that align organizational strategies, task demands, skills and abilities of organizational members, and the appropriate design of teams.

Rewards Systems

Developing a reward system which emphasizes team performance (i.e., rewarding team level performance is related to higher team performance, business-unit performance, and to process improvements by teams and business-units). Reward group goal-oriented activities. The rewards system should also be designed to elicit group behaviors. Reward systems that are designed to support group leadership behaviors and group work processes. Reward systems based on group level performance. Rewards that encourage collaboration between team members, etc. Reward systems which allocate rewards based on group member needs. Reward and recognition programs that enhance team's outcome interdependence. Incentive mechanisms which develop positive group norms and which facilitate group evaluation of task-performance strategies.
Develop a system of consequences for goal attainment at the business-unit and team level (ensures all levels are accountable for meeting organizational goals. Ensure rewards are aligned with meeting organizational goals. Reward and recognition systems that make the team accountable to the organization as a whole. Reward employees according to business results and their contribution to the organization. Rewards employees for business results.

Individual Level Rewards

Reward individuals commitment to group activities. Design reward systems that encourage a worker's talents. Establish a reward system based on skill acquisition (e.g., pay-for-knowledge). Growth in employee capabilities. Employees' growth in their capabilities.

Types of Rewards

Increased compensation. Acknowledgment and recognition. Career advancement. Growth opportunities -- training or education, when certain behaviors or performance criteria are met. Reward performers for dedication and additional effort. Provide rewards in collaboration with performance evaluators.

Issues in Rewarding Performers

Provide information to individuals on team-based reward logic (i.e., organizational constituents reward logic must be changed before team-based reward systems can be perceived as fair). Ensure recognition and reward systems are perceived as fair. Reward and recognition programs that are available and attractive. Ensure rewards are important and performance-related. Distribute rewards based on actual
employee performance differences. Ensure rewards and recognition programs are predictable. A reward system that is clear, unambiguous. Reward systems which are clear in terms of what work is required from teams to be rewarded. Align rewards and recognition programs with corporate policy. Develop systems for defining, developing, and reviewing performance before developing a reward system. Align reward and recognition programs with training, encouragement, and follow-up. Focus reward and recognition programs on the "small" wins as well as the big successes mechanisms that use a multitude of rewards and recognition programs. Reward systems congruent with the organization's management style and consistent with evaluation systems. Reward systems that have agreement among key people about important goals and desirable or undesirable activities. Provide important rewards to the right managers for distribution. Provide rewards in a timely manner after the performance. Reward desired activities and discourage undesired activities. Align rewards with data-based management systems. Reward and performance management systems can be developed to encourage values, norms, and assumptions that employees will collaborate at work.. The development of reward systems that advertise and promote high-performing teams for use a role models. Reward transfer of learning between systems. Reward systems that support exploration. Reward systems that support collaboration during exploration. The design of organizational support systems congruent with behaviors they are designed to elicit.

**Leadership Systems**

The external leadership of teams can facilitate the ultimate success of teams. Should develop dynamic organization structures that are supportive of individual's

Task interdependence. Developing new skills. Providing resources. The management style suggested by this model is a facilitative style with a specific focus and the willingness of managers to intervene. Managerial support refers to supportive behaviors from management at all levels of the organization. Must publicize managerial support and commitment to teams.

**Executive Management Behaviors**

Executive management behaviors include financial systems, information systems, human resource systems, an interest in resolving cross-functional issues, the development of team-based structures and systems at the macro level of the organization, ensuring that team-based structures and systems meet the strategies and goals of the organization, demonstration of team-based logic by developing team-based structures and systems. Develop human resource systems that motivate individuals to work collaboratively. Managing business units and business-unit management teams. Ensuring that business-units optimize performance at all levels instead of focusing on the functional performance of business units. Facilitating decisions on trade-offs when competing preferences cannot be resolved laterally at lower levels. Interest in setting, communicating, and developing a shared understanding of corporate strategy and goals. Ensuring that strategies and priorities are communicated and understood. The alignment of goals among organizational units. The ability to set an organizational vision. The ability to develop processes that share the vision throughout the organization. Participation in performance management issues, including goal setting, performance
definition, performance review, and rewarding of performance. The ability to be
influenced from multiple directions and from multiple perspectives. A commitment to
communicating, participating, and working through differences. Learning. Good
decision-making skills. Customer orientation. Allocating resources between business
units. Allocating shared resources between business units.

Management Team Issues

Develop a shared understanding of where and how the management team was
leading the organization with other managers. The development of a shared
understanding. Clarifying values. Making issues concrete. Involving organizational
members in decisions. Clarifying decision-making. Responsibility for and facilitating
conflict resolution. Assisting in the development of team goals. Providing input in team
goal setting. Providing direction, including strategy, goals, and priorities. Participating
in the performance management of teams and business-units. Reviewing team
performance. Participating in the reward process for teams. Ensuring the appropriate
design of teams. Developing organizational structures and processes. Providing
information (e.g., priorities and goals. Allocating resources. Establishing and modeling
team-based norms. Eagerness to learn. Is influenced and will allow participation from
other levels. Use of systematic decision-making processes. Customer orientation.
Planning and setting goals with teams collaboratively. Encouraging team
self-management skills.
Coaching Skills

Encourage team goal setting consistent with organizational needs. Encourage teams to share performance management responsibility. Make teams "self-aware" by asking appropriate questions and developing feedback mechanisms. Encourage teams to use systematic decision-making processes. Encourage teams to adopt an attitude of continuous improvement. Develop technical mentoring skills. Skills in organizational design and change, including team design, team effectiveness, performance management processes, organizational change, and functional knowledge.

Clarity of Management Role

The structuring of management roles to reflect lateral relationships instead of hierarchical relationships. Ensuring management roles effectively handle business issues while simultaneously moving authority to teams. The extent of team self-management is clear and understood. The functions management and teams perform are clear and understood. The leadership roles assigned to team members are clear and understood. Task management roles between teams and managers. Performance management roles between teams and managers. Boundary management roles between teams and managers. Technical leadership roles between teams and managers. Ensuring that individuals without hierarchical authority can perform leadership roles. Focus teams on business-unit needs and assist teams in improving internal processes.

Conflict Resolution/Decision-Making

Develop forums for escalating issues when making decisions on trade-offs. Ensure right people are there. Ensure availability of managers or management teams
when making trade-offs between conflicting needs or priorities. Ensure team member attendance when talking through issues or deliberations. Ensure organizational commitment to team decision-making.

Basic Facilitation

Provide facilitation skills to teams. Coaching. Help team improve how the group works together. Provide coaching to teams when problem behaviors occur. Coach and encourage team members to develop open communication skills. Develop team cultures which promote the free exchange of ideas. Assist in the development of norms (e.g., expectations about acceptable behavior). Provide expectations that the team will succeed. Increase the self-efficacy of teams. Increase team energy and spirit. Persuade and encourage team members via highlighting success. Supportive management behaviors. Champion the team approach. Managers must attempt to comprehend and address group opinion because if the group believes that an issue is present, then the issue exists. Provide personal supervision.

Job Design

Coach and encourage team members to rotate jobs. Allow groups to develop their own task-driven interaction patterns. Group design that minimizes the size of the group. Job design that produces clear goals and roles. Maintain the meaningfulness and challenge of work processes. Encourage group norms of challenging and creating new performance strategies. Closely attend to the type and extent of outcome interdependence.
Other Important Behaviors

Provide and develop training. Offer employees chances for horizontal development. Address team needs over time. Incentives to increase communication behaviors of mature teams. Group membership changes. Provide feedback. Ensure information and feedback are available. Manage External Boundaries -- as control of activities become the responsibility of members within the boundary of the team, the more the role of the team's manager becomes one of handling boundary activities. Ensuring adequate resources. Attainment of equipment and supplies to meet team goals. Coordinating with other departments. Decrease misunderstandings with interdependent groups. Communication links between the team and other organizational constituents. Scanning the external environment for changes that may affect internal boundaries. Support learning. Management practices that support the practice of recycling knowledge back into previous phases. Practices that support learning during the exploration phase. Provide "intellectual space" for knowledge workers. Pay close attention to the unique characteristics and values of knowledge workers. Sensitivity to the needs of knowledge workers. Less committed to the organization than to their work or other professionals. Knowledge workers often have needs in conflict with the needs of customers. Want control over which projects they work on. Resist outside intervention. Managers must be sensitive to the rhythms and phases of knowledge workers and adjust management behaviors to meet the rhythmic needs of a group. Management behaviors must change during the different phases of knowledge development. Ensure appropriate parties are included in the discovery and exploration phases. Ensure all necessary information is
available to knowledge workers during the exploration phase. During the discover and exploration phases, managers must use their intuitive sense in knowing when to intervene, when to apply pressure, when to give direction, or when to leave the team alone. Management behaviors might be different in the implementation stage, however, when deadlines, timing, coordination issues, and execution issues are critical to implementation activities. Must be sensitive to the hidden nature of variances in knowledge work. Sensitivity to the time requirements of knowledge work. Must be sensitive to the nonroutine nature of knowledge work (e.g., uncertain time frames, intuitive decision-making, conflicting goals). Must understand the need for flexibility in knowledge-based teams.
APPENDIX D

QUESTIONS FOR SUBJECT MATTER EXPERTS
**Information System**

My team can easily collect, organize, and store information needed to perform our jobs. My team can easily give information to other teams (or work areas). My team can easily get information about the team meeting its goals. My team can easily get information from other teams (or work areas). My team can combine information with other teams. My team can easily get information on costs of work. My team can easily get information on quality of work. My team can easily get information on scheduling of work. My team has the "big picture" of how work flows through my company. My team can easily get information on my company's mission and vision statements. My team can easily get information on my company goals, strategies, and priorities. My team can easily get information on business-unit goals, strategies, and priorities. I have the "big picture" of how work flows through my team. My team can easily get information on team work processes. My team can easily get information on team goals, strategies, and priorities. My team can easily get information on training opportunities. My team can easily get information about career opportunities within the organization. My team can easily get information on our company's suppliers. My team can easily get information on our company's customers. My team can easily get information on our company's competitors. If I learn something, I can easily share it with team members. My team tries to learn from my experiences. My team can easily get information from my direct supervisor. My team can easily get information from managers other than my direct supervisor. My team has decision-making tools to compare and evaluate different types
of information. My team has information systems similar to other work areas in my company. I routinely store my learnings for team use.

Rewards

My pay is based on my team's performance. My pay is based on my company's performance. I get more pay if I learn new skills. My team is paid more (or is recognized) for improving work procedures. My team gets extra training when we meet performance goals. My team gets more pay (or is recognized) for additional effort. My team learns new jobs when we meet performance goals. My team's pay system is fair. My team's recognition program is fair. My team is paid (or is recognized) in a timely manner, after achieving goals. My team is paid (or recognized) for sharing learnings with other teams (or work areas). I am paid (or recognized) for sharing learnings with other team members. My team is paid (or is recognized) for sharing information with other teams (or work areas). I am paid (or recognized) for sharing information with other teams (or work areas). My team's pay is based on reaching specific goals. When my team meets training goals, we are paid more (or recognized). When I meet training goals, I am paid more (or recognized). When I meet performance review goals, I am paid more. When my team meets performance review goals, we are paid more. There are times when my team is recognized when we should be paid. As my team gets more responsibilities, we get rewarded for it. My team's pay is based on actual performance. My pay is based on actual performance. My team gets informal rewards when we meet performance goals. I get informal rewards when I reach performance goals.
Integration

My team can easily access other teams (or work areas) through formal and informal channels. My company uses multi-functional teams to integrate work. When work is complicated or changes a lot, my team selects someone to help us work together. When my team lacks skills to do a job, we select someone to help us work together. For short-term jobs, my team selects someone to help us work together. When information about work is hard to find and/or understand, my team selects someone to help us work together. When our team is large, my team (or work area) selects someone to help us work together. My team rotates leadership roles. My team rotates job roles. My team has meetings to share information. My team has meetings with other teams (or work areas) to share information. My team has meetings with customers to share information. My team has meetings with suppliers to share information. My team has a pay system like other work areas in my company. My team has a planning system like other work areas in my company. My team has a goal-setting system like other work areas in my company. My team has a decision-making system like other work areas in my company. My team has a training system like other work areas in the company. My team has a performance review system like other work areas in the company. My direct supervisor's role is to integrate work with other teams (or work areas). My team routinely coordinates work with other teams or (work areas). My team formally evaluates other work areas that support our work (e.g., the computer department or human resources). My team evaluates the support received from managers and supervisors. My team has a formal method for resolving conflicts (e.g., about work or between people).
Group Design

My team elects its leader. Members of my team work in the same location. My team has its own work area. My team has meeting space available when we need it. My team can hire new team members. My team can fire team members. My team can discipline team members. My team members are skilled at doing their work. My team members have good people skills. My team members are good at learning new skills. My team members like working with other people. My team members take responsibility for work. My team has the skills it needs to perform work well. My team has members that represent a variety of technical areas. My team has the leadership skills it needs to perform work well. My team has members that represent a variety of points of view. My team has the needed business knowledge to perform work well. My team is the right size to perform work well. My team makes decisions about how work is done. My team makes decisions about which team member does a particular job. My team makes decisions to improve how work is done. My team sets its own goals. My team is responsible for tracking the costs of doing work. My team is responsible for tracking the quality of work. My team is responsible for tracking profits. My team is involved in developing budgets. My team works directly with internal customers. My team works directly with external customers. My team can work directly with other teams. My team has the time to change work processes (i.e., the way work gets done). My team has the time to set goals. My team has the time to change work strategies. My team has the money to change work processes (i.e., the way work gets done). My team has the money to change strategies. My team can access experts from other work areas. My team fixes
quality errors. My team lets people with the most knowledge make decisions. My team has clear work roles. My team has clear decision-making roles. My team makes many work related decisions. My team has easy access to a qualified facilitator.

**Performance Review**

My team uses measurable goals. My team measures costs. My team measures quality. My team measures profits. My team measures my satisfaction with the team. My team measures customer satisfaction. My team measures my skills. My team uses measurements to improve performance. My team measures team performance. My team measures my performance. I feel good about the measurements my team uses. Team measurements are agreed upon by all team members. My team is rated by multiple parties/groups. My team measures my performance using multiple measures. I am rated by multiple parties/groups. My team rates its own performance as a team. I rate my own performance. My team rates other teams' performance. My team is rated by other teams. My team is rated by managers. My team is rated by customers. I am rated by other members of the team. My team uses concrete/specific performance measurements. My team uses performance measurements that are easy to understand. My team has regularly planned performance reviews. My team has regular informal performance reviews with management. My team has regular informal performance reviews with customers. My team is reviewed by parties/groups who are familiar with the work. I am reviewed by parties/groups who are familiar with my work. My team is reviewed by parties/groups who are trustworthy. I am reviewed by parties/groups who are trustworthy. My team determines when performance criteria should change. My team develops action plans
from performance reviews. Team members give each other regular, informal feedback. My team measures our direct supervisor's performance. My team gives other teams regular, informal feedback. My direct supervisor uses specific team measurements. My direct supervisor uses performance measurements that are easy to understand. The team and our direct supervisor use similar team measurements. My team uses multiple performance measures.

Defining Performance

My team's goals are aligned with company goals. My team's goals are aligned with other teams' goals. My individual goals are aligned with team goals. My team has customers help define team goals. My direct supervisor helps set team goals. My direct supervisor helps set my goals. Members of the team are aware of each others' work commitments. My direct supervisor helps set team priorities. My direct supervisor helps set my priorities. My team uses measurements to evaluate team goals. Team members' work commitments are considered when assigning new responsibilities. My team uses measurements to evaluate my individual goals. My team uses measurements to evaluate company goals. My team is involved in setting company goals. My team is involved in setting team goals. I am involved in setting my goals. My team is involved in setting the company's mission and vision. My team is involved in setting my individual goals. My team has goals that are agreed upon by all team members. Team members have goals that are agreed upon by the team. My team has goals that require high-levels of performance. I have goals that require high-levels of performance. My team uses its goals to guide decision-making. My team takes available resources into account when setting goals.
My team aligns goals with other teams (or work areas). My team has clear team priorities. My priorities are clear. My team can easily determine when goals change. My team can easily determine when my goals should change.

**Training**

My team receives training as an ongoing part of the job. I receive training with my team members. I can train with experts in other work areas. My team trains with other teams (or work areas). My team measures its training needs. My team schedules training. My team can easily get experts for training. My team can easily access formal training programs. My team has easy access to informal learning opportunities. My team has easy access to on-the-job cross-training opportunities. My team has easy access to training on goal-setting. My personal developmental plan provides for off-site learning opportunities. It is easy for my team to learn administrative skills. It is easy for my team to learn about the company's business. My team has easy access to training on process redesign. My team can easily get training on performance development strategies. My team can easily get training on new technical skills. My team can easily get training on problem-solving. My team can easily get training on decision-making. My team can easily get training on leadership skills. My team can easily get training on stress-management skills. My team can easily get training on interpersonal skills. My team can easily get training on communication skills. My team can easily get training on conflict-resolution skills. My team gets training when we need it. My team's training opportunities are of high quality. My team can easily get training on group meeting skills.
Direct-Supervisor Support

My direct supervisor gives my team the training it needs. My direct supervisor helps provide my team the resources it needs. My direct supervisor coordinates work with other teams. My direct supervisor helps set team strategies. My direct supervisor helps set my work strategies. My direct supervisor reviews my team performance frequently. My direct supervisor reviews my performance frequently. My direct supervisor is open to multiple perspectives. My direct supervisor is dedicated to meeting customer needs. My direct supervisor involves others in decision-making. My direct supervisor has good decision-making skills. My direct supervisor clarifies decision-making roles. My direct supervisor provides needed information to teams. My direct supervisor is eager to learn. My direct supervisor is a role model for the team. My direct supervisor sets goals collaboratively. My direct supervisor encourages my team to determine training needs. My direct supervisor encourages my team to evaluate performance. My direct supervisor encourages my team to set goals. My direct supervisor encourages the team to continuously improve work processes. My direct supervisor has skills in work redesign. My direct supervisor helps resolve conflicts. My direct supervisor helps clarify team role responsibilities. My direct supervisor expects the team to succeed. My direct supervisor helps the team work together. My direct supervisor provides timely feedback to the team. My direct supervisor provides timely feedback to individuals. My direct supervisor supports learning by the team. My direct supervisor helps provide the budget needed to meet team goals. My direct supervisor
helps provide the time needed to meet team goals. My direct supervisor sees the team as a customer. My direct supervisor helps us only when we need it.

**Executive-Manager Support**

My company's managers and executive managers are role models for teams. My company's managers and executive managers make sure that different areas of the company work well together. My company's managers and executive managers make sure that my team understands our company's vision and priorities. My company's managers and executive managers align goals among different work areas. My company's managers and executive managers help provide teams the resources they need to perform work. My company's managers and executive managers are dedicated to meeting customer needs. My company's managers and executive managers are open to multiple perspectives. My company's managers and executive managers are eager to learn. My company's managers and executive managers expect teams to succeed. My company's managers and executive managers see teams as customers. My company's managers and executive managers develop information systems that help my team perform work. My company's managers and executive managers develop goal setting systems that help my team understand what work to perform. My company's managers and executive managers develop reward systems that motivate my team to perform work. My company's managers and executive managers develop training systems that help my team perform work. My company's managers and executive managers develop performance review systems that help my team understand how to perform work. My company's managers and executive managers develop human resource systems that help
my team perform work. My company's managers and executive managers involve unions in the team concept. My company's managers and executive managers quickly resolve problems between work areas of my company.
APPENDIX E

INSTRUCTIONS FOR SUBJECT MATTER EXPERTS
Definitions for Subject Matter Experts

The following are definitions to help you in your role as a subject matter expert. If you have any questions, please call Christopher Hall at (972) 221-8836.

Definitions

Mechanism: a mechanism represents one aspect of a system that can be managed.

Team: please use the teams you have worked with as a reference point.

Direct Supervisor: we are using this term to mean an individual's immediate boss or "superior", regardless of the bosses' title (e.g., manager or supervisor).

Manager & Executive Manager: these terms refer to managers above an individual's immediate boss.

Definition of the Nine Support Systems

The nine categories were developed by sorting potential mechanisms into categories. The nine support systems are meant as a heuristic to help us identify and sort potential mechanisms. We have already reduced potential mechanisms from a list of 750 to about 250. The following definitions are not comprehensive and are intended to give you a general idea of the system.

Information. This system represents ways that organizations can respond to the information processing and knowledge gathering needs of teams.

Rewards. This system represents ways teams are paid or recognized for their efforts.
Integration. This system represents tools or methods that facilitate coordination efforts between team members or between teams.

Group Design. This system represents facets of organizational structure and inputs for the team, including team composition, team location, and team resources.

Performance Review. This system represents individual and team measurements: what is measured, when, and by whom.

Defining Performance. This system represents different aspects of individual and team goal and priority setting, including roles and responsibilities.

Training. This system refers to employee development, including a learning environment, formal training, and informal learning opportunities.

Direct-Supervisor Support. This system represents ways that direct supervisors show support for the team concept, formally and informally.

Executive-Manager Support. This system represents ways that managers and executive managers show support for the team concept, formally and informally.

Directions for Subject Matter Experts

The following are directions to help you in your role as a subject matter expert. If you have any questions, please call Christopher Hall at (972) 221-8836.

Directions

When reading these items, please use this perspective: What aspects of an organization are essential for work team effectiveness? Rate the importance of an item for supporting effective teams by circling the number of the rating scale. There are five possible ratings: 1 equals damaging to teams (the content of the item could actually
damage effective team performance); 2 equals irrelevant (the content of the item will neither help nor hurt effective teams); 3 sometimes useful (the content of the item can occasionally be helpful for supporting effective teams); 4 equals valuable but not essential (the content of the item is often useful, but not absolutely necessary for supporting effective teams); and 5 equals essential (the content of the item is absolutely necessary for supporting effective teams).

The items are written in their final format (i.e., from the viewpoint of a team member completing the survey). If you believe a mechanism should be added to a system, write the item in the spaces provided. A completed list of all subject matter experts' added mechanisms will be faxed to you for rating within a few days of receipt. If there are ways to clarify the phrasing of items, please indicate changes on the survey form. We would greatly appreciate it if you could complete and return your rankings within a week of receiving this document. An addressed and stamped return Priority Mail envelope is provided in the materials. Please place the completed survey into the Priority Mail envelope and mail. We will send you the results once all subject matter experts have returned their ratings. Thank you!
APPENDIX F

INSTRUCTIONS AND RATING SCALE FOR THE SUPPORT SYSTEMS SURVEY
Directions

Below is a list of types of support work groups may need to achieve their goals. On the left and right sides of the list are two scales for rating the items in the list. On the left side, rate how well the item describes your work group. On the right side, rate how important that type of support is for getting your group's work done.

Rating Scale

1 = not at all.
2 = to a little extent.
3 = to some extent.
4 = to a great extent.
5 = to a very great extent.
APPENDIX G

SUPPORT SYSTEMS SURVEY
Information

27. My work group can easily get information about our customers.

33. My group has the "big picture" of how work flows through our company.

36. My work group can easily collect, organize, and store information needed to perform our jobs.

43. Group members have the "big picture" of how work flows through my group.

52. My work group can easily get information from managers other than our direct supervisor.

58. My work group can easily get information on business-unit goals, strategies, and priorities.

76. Individuals on my group try to learn from other group members.

90. My work group can easily get information on our purpose in the organization.

93. My work group can easily get information about company goals, strategies, and priorities.

108. My work group can easily share learnings (such as new knowledge) with other groups.

114. Individual group members can easily share learnings (such as new knowledge) with other group members.

127. My work group can easily get information from our direct supervisor.

139. My work group can easily get information on the quality of our work.

142. My work group can easily access information on the scheduling of work.

160. My group can easily get information on how the group is meeting its goals.
Executive Manager

29. My company's managers and executives develop systems that help my group share information.

47. My company's managers and executives see work groups as customers.

49. My company's managers and executives develop goal-setting systems that help our group understand what work to perform.

63. My company's managers and executives expect work groups to succeed.

67. My company's managers and executives are open to multiple perspectives (such as different points of view).

70. My company's managers and executives make sure that my group understands our company's vision and priorities.

78. My company's managers and executives make sure that different areas of the company work well together.

91. My company's managers and executives develop performance review systems that help my group understand how to perform work.

92. My company's managers and executives align goals among different work areas.

95. My company's managers and executives involve unions in the development of work groups.

112. My company's managers and executives are role models for groups.

115. My company's managers and executives help provide work groups the resources they need to perform work.
131. My company's managers and executives develop training systems that help my group perform work.

133. My company's managers and executives develop reward systems that motivate my group to perform work.

135. My company's managers and executives are dedicated to meeting customer needs.

Rewards

30. When my work group meets performance review goals, we are paid more (or recognized).

38. Pay for individual group members is based partly on individual performance.

46. Pay for individual group members is based partly on the company's performance.

56. Pay for individual group members is based partly on our group's performance.

59. Our group's pay is based on actual performance.

62. My work group's pay system is fair.

68. After we get more responsibilities, our work group gets rewarded (or recognized) in a timely manner.

82. After achieving goals, my work group is paid (or is recognized) in a timely manner.

83. My group's recognition program is fair.

99. Pay for individual group members is based on actual performance.

100. Pay for my group is based on reaching specific goals.

140. For our group, rewards depend more upon meeting group goals than individual goals.

144. My work group gets more pay (or is recognized) for additional effort.
155. My work group gets informal rewards when we meet performance goals.

157. My work group is paid more (or is recognized) for improving work procedures.

**Direct Supervision**

31. My direct supervisor provides needed information to our group.

35. My direct supervisor sets goals collaboratively with our group.

40. My direct supervisor is a role model for our group.

50. My direct supervisor supports learning by our group.

84. My direct supervisor helps our group work directly with other groups.

101. My direct supervisor sees our group as a customer.

102. My direct supervisor is dedicated to meeting customer needs.

106. My direct supervisor provides the time needed to meet group goals.

107. My direct supervisor involves the work group in decision-making.

113. My direct supervisor encourages our work group to set goals.

121. My direct supervisor provides timely feedback to our group.

136. My direct supervisor expects our group to succeed.

146. My direct supervisor encourages our group to evaluate its performance.

151. My direct supervisor encourages our group to continuously improve work processes.

153. My direct supervisor provides our group resources it needs.

**Performance Appraisal**


41. Group members give each other regular, informal feedback.
53. My work group has regularly planned performance reviews.

54. My work group uses multiple performance measures.

57. Work group measurements are agreed upon by all group members.

60. To track group goals, my group uses specific performance measurements.

71. My work group uses performance measurements that are easy to understand.

73. My work group develops action plans from performance reviews.

75. Group members feel good about the measurements we use.

79. My direct supervisor uses specific measurements for our work group.

103. My group's direct supervisor uses performance measurements that are easy to understand.

110. My group and our direct supervisor use exactly the same group measurements.

117. Others who depend on my work group (such as customers or other groups) evaluate my group's performance.

132. My group uses performance reviews as a way to improve performance.

148. My work group uses measurements to improve performance.

Defining Performance

45. Individual group members help set their individual goals.

61. My group's goals are aligned with other groups' goals.

64. My work group uses its goals to guide decision-making.

77. My work group can easily determine when our purpose in the organization changes.

86. Our individual group members have clear priorities.

88. My work group takes available resources into account when setting goals.
111. My work group's priorities are clear.

116. Others who depend on my work group (such as customers or other groups) help set my group's goals.

122. My work group is involved in setting our group's goals.

134. My group's goals are aligned with company goals.

143. Members of my group are aware of each others' work commitments.

152. Individual group members have goals that require high-levels of performance.

154. My work group has goals that require high-levels of performance.

156. My work group's goals are aligned with business-unit goals.

159. Our individual group members' goals are aligned with group goals.

Training

34. My work group can easily get training to help us develop new technical skills.

48. My work group can easily get training on problem-solving skills

65. My work group has easy access to informal learning opportunities.

66. My group's training opportunities are of high quality.

69. My work group can easily get training on redesigning our work methods (the way we perform work).

80. My group can easily get experts to help train our group.

98. My work group can easily get on-the-job training.

109. My work group can easily get training on communication skills.

118. My work group can easily get training on decision-making skills.

119. My work group can easily learn about the company's business.
120. My work group receives training as an ongoing part of the job.

124. My work group can easily get training on interpersonal skills.

125. Work group determines its own training needs.

138. My work group can easily get training on group meeting skills.

147. My work group gets training when we need it.

**Group Design**

28. My work group makes many work-related decisions.

37. Our group makes decisions to improve how work is done.

44. My group works directly with customers.

55. My work group has the skills it needs to perform work well.

74. My work group makes day-to-day decisions about how work is done.

81. Individuals on my group can easily learn new skills.

85. My group can access experts from other work areas.

89. My group members have good people skills.

96. Individuals on my group are skilled at doing their work.

129. My work group makes the time to set goals.

137. My work group makes the time to change work processes (i.e., the way work gets done)

141. My work group is responsible for tracking the quality of work.

149. My work group has the needed business knowledge (such as budgeting skills, planning skills, and goal-setting skills) to perform work well.

158. My work group fixes quality errors.
161. Members of my group take responsibility for work.

Integration

32. My group routinely coordinates work with other work groups.

42. My company uses multi-functional (cross-disciplinary) groups to integrate work.

51. My work group has meetings with other groups to share information.

72. My work group can easily work with other groups or work areas.

87. My work group formally evaluates our supervisors and/or managers.

94. My work group has meetings to share information.

97. My work group has a performance review system like other work areas in the company.

104. My work group has a goal-setting system like other work areas in the company.

105. My work group has a pay system like other work areas in the company.

123. My work group rotates leadership roles.

126. My work group has a formal method for resolving conflicts (such as conflicts about work or conflicts between people).

128. My work group evaluates the support received from managers and supervisors.

130. My work group has meetings with suppliers to share information.

145. When work is complicated or changes a lot, our group selects someone to help us work together.

150. My work group has meetings with customers to share information.
APPENDIX H

EFFECTIVENESS CRITERIA FOR THE ADAPTED VERSION OF BEYERLEIN’S
(1996) PERCEPTIONS OF TEAM PERFORMANCE

Hackman's (1987) effectiveness criteria included: (1) task output is acceptable to those who receive or review it; (2) the capability of group members to work together in the future is maintained or strengthened; and (3) group members are more satisfied by group experiences than frustrated. Note: The first effectiveness criteria is similar to Beyerlein's (1996) customer satisfaction and quality of service to customer's criteria and will not be used.


Gladstein's (1984) effectiveness criteria included: (1) performance (revenue and self-rated performance on problem-solving, decision-making, and work performance); and (2) satisfaction (satisfaction with the team; satisfaction with the work, including the compensation system evaluation system, advancement, and workload; and satisfaction with serving customers and meeting customer needs). Note: The work performance and customer criteria are sufficiently covered in Beyerlein's (1996) effectiveness criteria and will not be used.


May and Schwoerer's (1994) Model for Fostering Work Team Efficacy and Effectiveness

May and Schwoerer do not explicitly state team effectiveness criteria. However, they did argue that team effectiveness can be evaluated by the "team members' collective belief in their capability to perform their job" (p. 30). This, then, may be used as a criterion for determining team effectiveness.


Pearce and Ravlin (1987) argued that evaluation criteria included: (1) employee satisfaction; (2) absenteeism; (3) turnover; (4) safety; (5) innovation; and (6) productivity. Note: Employee satisfaction and innovation are covered in the previous models of team effectiveness or in Beyerlein's (1996) Perceptions of Team Performance Scale.

Cohen's (1994) Model of Self-Managing Team Effectiveness

Cohen (1994) evaluates team effectiveness using three criteria: team performance, member attitudes with quality of work life, and withdrawal behaviors. Team performance includes: (1) controlling costs; (2) improving productivity; and (3) improving quality. Member attitudes with quality of work life include: (1) job satisfaction; (2) team satisfaction; (3) social satisfaction; (4) growth satisfaction; (5) trust in management; and (6) organizational commitment. Note: Controlling costs, improved productivity, improved quality, team satisfaction, and social satisfaction have
been included in the other models of team effective or in Beyerlein's (1996) Perceptions of Team Performance Scale.

Sundstrom, De Meuse, and Futrell's (1990) Framework for Analyzing Work Team Effectiveness

Sundstrom, De Meuse, and Futrell (1990) argued that effectiveness can be defined and measured by: (1) manager ratings; (2) sales; and (3) other quantitative measurements. Note: Sales and many quantitative measurements are included in other models of team effectiveness and Beyerlein's (1996) Perception of Team Performance Scale.
APPENDIX I

DEMOGRAPHIC QUESTIONS AND QUESTIONS TO EVALUATE HYPOTHESES
Directions

Circle your answer or mark your response in the space beside each question.

Circle only one number for each question. If you work on multiple work groups, answer questions for the group you work on most often. Take short breaks if necessary.

However, try to finish all surveys within a few hours. Use the current status of your group (how your group is now) when answering questions.

Date: ____________________

Name: ____________________

Work title: ____________________

Address: ______________________________________

City: ____________________ State _______ Zip _______

Phone: ____________________

1. Sex:  1 = F  2 = M

2. Age: ____________________

3. Work group name: ____________________

4. Department name: ____________________

5. Business-unit name: ____________________

6. Organization name: ____________________

7. How many people do you supervise? ____________________

7b. How many people are on your team? ____________________

8. Does your organization consider you to work on a work team?  1. Yes  2. No

9. Do you consider yourself to work on a work team?  1. Yes  2. No
Supplementary Directions

If you answered Yes to question (8) or (9), consider yourself and these individuals as your work group. If you answered No to questions (8) and (9), consider the individuals who report to your direct supervisor as your work group.

10. Read the descriptions below and circle the number that best describes your work group:

   1. High amounts of decision-making authority, rewards are based on group performance, jobs are broadly defined (members have many responsibilities).
   2. Low amounts of decision-making authority, rewards are based on individual performance, jobs are narrowly defined (members have fewer responsibilities).

11a How long do you think your work group will last?

   1. A few months  2. About a year  3. Many years

11b. How many years has your work group existed?

   1. Less than six months  2. Six months to a year
   3. 1 to 3 years  4. More than 3 years

12. Who oversees the work of your group?

   1. A supervisor or manager  2. A coach  3. Multiple supervisors, managers, or coaches  4. No one, we are autonomous

13. How many work groups does your supervisor/manager/coach oversee?


14. For the most part, does your group work in the same physical location?

   1. Yes  2. No
15. How often does your group meet face-to-face?

1. Daily  2. 1 or 2 times weekly  3. 1 or 2 times per month  4. 1 or 2 times per year

16. Do members of your work group rely heavily on computers and other electronic tools for communications with each other?  1. Yes  2. No

17. How often does your work group make significant work-related decisions?


18. What kinds of problems are discussed in your work group meetings?

1. Technical  2. Interpersonal  3. Technical and interpersonal

19. For the most part, is your work group composed of individuals:

1. From the same work function in your organization (such as all from welding or all from engineering?)

2. From different functions in your organization (such as a mix from sales, engineering, and marketing?)

3. From areas both inside and outside the company (such as a mix from sales, engineering, and external customers?)

20. Circle the number below that best describes the group you work on most often:

1. Management group -- responsible for setting goals, overseeing projects, and making decisions

2. Problem-solving group -- solve specific short-term problems and/or perform specific short-term tasks
3 Professional or technical support group -- provide long-term assistance to others in the organization

4 Performing group -- make the product or provide the service offered by the organization

21. Which item best describes the work your group performs:

1 Production work -- work with tools and materials to create products; usually involves physical work; usually distant from the end customer; examples include welders, construction workers, and assembly line workers

2 White-collar (1): process large amounts of information; usually distant from the end customer and heavily computerized; examples include order processing and billing

3 White-collar (2): one-on-one encounters with customer; usually provide advice to meet customer needs; examples include lawyers, financial advisors, and sales representatives

4 White-collar (3): multiple individuals in organization provide services to customers; examples include hospitals and consulting groups

5 White-collar (4): multiple individuals in organization develop new products; work with other technical and/or service providers to create, share, and utilize ideas for solving problems or creating new services; examples include multi-disciplinary project development work groups, engineering groups, and architectural groups
22. If you circled 5 — white-collar (4) — on the previous question, please circle the stage of development your group is currently in (otherwise, go on to the next question):

1. **Discovery** — attempting to find knowledge and information about the project
2. **Exploration** — analyzing or exploring possible solutions to the problem
3. **Testing** — a pilot implementation of the possible solution
4. **Implementation** — full scale implementation of the solution

23. Which item best describes your direct supervisor/coach/manager's relationship with your work group:

1. makes decisions, sets goals, and gives job assignments
2. gets employee input about decisions, goals, and job assignments, but makes final decisions
3. gets input about decisions, goals, and job assignments and makes final decisions with employees
4. allows employees to make decisions, set goals, and make job assignments
APPENDIX J

CONSENT FORM AND REQUIREMENTS TO RECEIVE FEEDBACK REPORTS
Overview

Our Research Team invites you to participate in our investigation of work groups. Participation means completing several surveys, and if enough of your group participates, receiving a feedback report. We believe that work groups and collaborative work systems can greatly benefit organizations. Unfortunately, there have been few scientific studies to show how organizations can support effective work groups.

Intent of this Study

The following surveys were designed to: (1) assess opinions concerning organizational support for groups; (2) evaluate perceptions of group empowerment levels; and (3) assess opinions concerning group effectiveness. We also ask questions to understand how groups are structured and the environment in which work groups perform. This study is a new research component from the Center's study "Leadership of Technical and Professional Teams." The original study was partly funded by the National Science Foundation's program "Transformation to Quality Organizations."

Feedback Report Requirements

For groups to receive feedback reports, at least four individuals or a minimum of 60% of the group's members -- whichever is more -- must complete the surveys. For example, a group with ten members must have six individuals complete the surveys to receive a report. In addition, if you have three or more groups that qualify for a group-level report, then an overall, composite report can be obtained. We can then compare group-level results with overall composite results. Finally, for each report, we require that one individual act as a liaison between your group and our Research Team.
That individual will distribute surveys to group members, return surveys to our Research Team, and distribute feedback reports.

**Research Team Rules**

Our first priority is to ensure the confidentiality of individuals' survey responses -- your survey responses will never be given to the organization. Thus, so that no one individual's responses are accidentally revealed in feedback reports, we require a minimum number of individuals to complete the surveys. Also, feedback results will be based on composite scores -- individual scores will be summarized into group scores and these results will be presented in feedback reports. We want this to be a positive experience for you and your organization. In the future, we hope your group will complete additional surveys from our Research Team.

Note that participation in any part of this investigation is voluntary. Individuals who agree to participate are free to withdraw from the study at any time without penalty, prejudice, or loss of benefits.

Return of your survey indicates willingness to participate in this project.

Please Return Surveys to:

Center for the Study of Work Teams
Department of Psychology
ATTN.: Support System Survey
P.O. Box 311280
Denton, TX 76203-1280
If you have any additional questions about the study, please call the project director, Michael Beyerlein, Associate Professor of Psychology, Christopher Hall, or John Adcock at (940) 565-3096. Thank you for your participation and time.
APPENDIX K

FACTOR ANALYSIS: SUPPORT SYSTEM SURVEY
The Support Systems Survey is an exploratory instrument: a comprehensive study of the underlying attributes (i.e., factors) of the survey has not been performed. Thus, exploratory factor analysis was used to determine the underlying attributes of the survey (e.g., Campion, Medsker, & Higgs, 1993; Kirkman & Rosen, 1996). Given that the ratio of subjects to items is small for factor analyses (Stevens, 1986), the following analysis should be approached cautiously. Additionally, to maintain as high a ratio of subjects to items as possible, the data set was not screened for multivariate outliers.

Importance scale items were analyzed using a principal components extraction method and a varimax rotation. Importance scales items were utilized, since these items represent what subjects perceive as the most important organizational support needed to perform work. Additional research might compare factor analyses results on Presence scale items to the current results. The principal components extraction method and varimax rotation are reported in this section, since most researchers use these methods during the initial factor exploration of a data set (Tabachnick & Fidell, 1996).

Principal components extraction resulted in 26 factors with eigenvalues > 1.0. Both principal components and principal axis extraction methods produced initial factors with high eigenvalues. Further, both methods produced a similar number of factors with eigenvalues > 1.0. However, examination of the eigenvalues using a scree plot suggests that a 10 factor solution might be the most appropriate. A 10 factor solution accounts for 51.9% of the variance (a 26 factor solution accounts for 67.4% of the variance). Table 38 presents factor loadings using a 10 factor solution, and a principal components extraction method with a varimax rotation. Items are listed by their number as presented in
Appendix G and are the same numbers used in the survey materials completed by subjects. Finally, only factor loadings > .30 are reported.

Table 38.

Support Systems Survey Importance Items: Factor Loading Scores

<table>
<thead>
<tr>
<th>Item #</th>
<th>Factors</th>
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<tbody>
<tr>
<td></td>
<td>1  2  3  4  5  6  7  8  9  10</td>
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<tr>
<td>60</td>
<td>.67 .65 .67 .65 .62 .58 .56 .54 .53 .53</td>
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Examination of Table 38 indicates that some items have correlations > .30 with several factors. For instance, item 71 is correlated .30 with factor five and correlated .34 with factor 6. To simplify interpretation of the factors, items that have factor loading differences ≥ .05 are not interpreted. For instance, item 146 “my direct supervisor encourages our group to evaluate its performance”, is correlated .41 with factor one and is correlated .37 with factor four. Since the difference between the factor loadings was .05 (.41 - .37 = .05), the item was not included in the following interpretative text.

Using this criteria, the following items were not "assigned" a factor (numbers in parentheses indicate the item number): (146) my direct supervisor encourages our group to evaluate its performance; (102) my direct supervisor is dedicated to meeting customer
needs; (46) pay for individual group members is based partly on the company's performance; (49) my company's managers and executives develop goal-setting systems that help our group understand what work to perform; (134) my group's goals are aligned with company goals; (111) my work group's priorities are clear; (71) my work group uses performance measurements that are easy to understand; (28) my work group makes many work-related decisions; (119) my work group can easily learn about the company's business; (135) my company's managers and executives are dedicated to meeting customer needs; (126) my work group has a formal method for resolving conflicts (such as conflicts about work or conflicts between people); (88) my work group takes available resources into account when setting goals; (75) group members feel good about the measurements we use; (112) my company's managers and executives are role models for groups; (150) my work group has meetings with customers to share information; (142) my work group can easily access information on the scheduling of work; (37) our group makes decisions to improve how work is done; (57) work group measurements are agreed upon by all group members; (41) group members give each other regular, informal feedback; and (72) my work group can easily work with other groups or work areas.

When these items are compared to the nine hypothesized Support Systems Survey scales, there appears to be no discernible pattern for these "complex" items (Tabachnick & Fidell, 1996). Complex items are items that have high loadings on several factors, which makes factor interpretation difficult (Tabachnick & Fidell, 1996).

Compared to the original hypothesized scales, these items appear to represent each of the
nine Support Systems Scales: two items are from the Group Design scale, three items are from the Defining Performance, three items are from the Direct Supervision scale, one item is from the Information scale, three items are from the Executive Manager scale, one item is from the Rewards scale, three items are from the Performance Appraisal scale, one item is from the Training scale, and three items are from the Integration scale.

One possible explanation for these results is that the item are "meta-items" so that each item represents multiple aspects of organizational support. For instance, item 102 "my direct supervisor is dedicated to meeting customer needs", and item 135 "my company's managers and executives are dedicated to meeting customer needs" represent several aspects of organizational support and subsequent outcomes (i.e., Executive Manager support, Direct Supervision support, and an outcome -- Customer Satisfaction). Thus, these items may represent organizational components that are emphasized throughout multiple organizational support systems. These results could use further study.

Factor One: Performance Measurement and Review

The first factor consists of the following items: (53) my work group has regularly planned performance reviews; (60) to track group goals, my group uses specific performance measurements; (54) my work group uses multiple performance measures; (79) my direct supervisor uses specific measurements for our work group; (110) my group and our direct supervisor use exactly the same group measurements; (103) my group's direct supervisor uses performance measurements that are easy to understand; (97) my work group has a performance review system like other work areas in the
company; (104) my work group has a goal-setting system like other work areas in the
company; (113) my direct supervisor encourages our work group to set goals; (132) my
group uses performance reviews as a way to improve performance; (73) my work group
develops action plans from performance reviews; (148) my work group uses
measurements to improve performance; (39) my work group measures group
performance; (121) my direct supervisor provides timely feedback to our group; (40)
my direct supervisor is a role model for our group; (129) my work group makes the time
to set goals; (31) my direct supervisor provides needed information to our group; (105)
my work group has a pay system like other work areas in the company; and (123) my
work group rotates leadership roles.

The majority of items for factor one appear to be assessing performance
measurement factors, including performance reviews, work measurements, and goal
setting. Compared to the original hypothesized scales, factor one seems to be primarily
composed of items from the Performance Appraisal scale. Several of the items are from
other scales, including the Direct Supervision, Rewards, and Integration scales. These
results offer additional evidence that Performance Review is an important aspect of
organizational support.

Factor Two: Training and Learning

The second factor consists of the following items: (109) my work group can
easily get training on communication skills; (118) my work group can easily get training
on decision-making skills; (138) my work group can easily get training on group meeting
skills; (120) my work group receives training as an ongoing part of the job; (124) my
work group can easily get training on interpersonal skills; (147) my work group gets training when we need it; (80) my group can easily get experts to help train our group; (66) my group's training opportunities are of high quality; (98) my work group can easily get on-the-job training; (48) my work group can easily get training on problem-solving skills; (65) my work group has easy access to informal learning opportunities; (34) my work group can easily get training to help us develop new technical skills; (69) my work group can easily get training on redesigning our work methods (the way we perform work); (131) my company's managers and executives develop training systems that help my group perform work; (81) individuals on my group can easily learn new skills; (125) my work group determines its own training needs; (128) my work group evaluates the support received from managers and supervisors; (50) my direct supervisor supports learning by our group; and (108) my work group can easily share learnings (such as new knowledge) with other groups.

The majority of items for factor two appear to be assessing a team training and learning opportunities. Compared to the original hypothesized scales, factor two seems to be primarily composed of items from the Training and Direct Supervision scales. Several of the items are from other scales, including the Executive Management and Integration scales. These results offer additional evidence that training and learning is an important aspect of organizational support.

Factor Three: Rewards

Factor three consists of the following items: (144) my work group gets more pay (or is recognized) for additional effort; (82) after achieving goals, my work group is paid
(or is recognized) in a timely manner; (133) my company's managers and executives develop reward systems that motivate my group to perform work; (68) after we get more responsibilities, our work group gets rewarded (or recognized) in a timely manner; (157) my work group is paid more (or is recognized) for improving work procedures; (62) my work group's pay system is fair; (59) our group's pay is based on actual performance; (56) pay for individual group members is based partly on our group's performance; (155) my work group gets informal rewards when we meet performance goals; (99) pay for individual group members is based on actual performance; (83) my group's recognition program is fair; (100) pay for my group is based on reaching specific goals; (38) pay for individual group members is based partly on individual performance; (30) when my work group meets performance review goals, we are paid more (or recognized); and (87) my work group formally evaluates our supervisors and/or managers.

The majority of items for factor three appear to be assessing group-based reward systems. Compared to the original hypothesized scales, factor one seems to be primarily composed of items from the Rewards scale. Several of the items are from other scales, including the Executive Management and Integration scales. These results offer additional evidence that Rewards is an important aspect of organizational support.

Factor Four: Goal Setting and Resource Alignment

Factor four consists of the following items: (154) my work group has goals that require high-levels of performance; (159) our individual group members' goals are aligned with group goals; (161) members of my group take responsibility for work; (152) individual group members have goals that require high-levels of performance;
(156) my work group's goals are aligned with business-unit goals; (136) my direct supervisor expects our group to succeed; (158) my work group fixes quality errors; (149) my work group has the needed business knowledge -- such as budgeting skills, planning skills, and goal-setting skills -- to perform work well; (141) my work group is responsible for tracking the quality of work; (153) my direct supervisor provides our group resources it needs; (160) my group can easily get information on how the group is meeting its goals; (143) members of my group are aware of each others' work commitments; (115) my company's managers and executives help provide work groups the resources they need to perform work; (122) my work group is involved in setting our group's goals; (151) my direct supervisor encourages our group to continuously improve work processes; (139) my work group can easily get information on the quality of our work; (137) my work group makes the time to change work processes -- the way work gets done; and (55) my work group has the skills it needs to perform work well.

The majority of items for factor four appear to be assessing goal-setting and the ability of teams to receive the information and resources needed to meet goals. Compared to the original hypothesized scales, factor four seems to be primarily composed of items from the Defining Performance, Group Design, Information, and Direct Supervision scales. One item is from the Executive Management scale. These results offer additional evidence that Defining Performance is an important aspect of organizational support. Additionally, these results suggest that effective goal-setting is complemented by mechanisms which ensure that resources are available to meet team goals.
Factor Five: Information on Alignment

Factor five consists of the following items: (70) my company's managers and executives make sure that my group understands our company's vision and priorities; (61) my group's goals are aligned with other groups' goals; (77) my work group can easily determine when our purpose in the organization changes; (93) my work group can easily get information about company goals, strategies, and priorities; (58) my work group can easily get information on business-unit goals, strategies, and priorities; (78) my company's managers and executives make sure that different areas of the company work well together; (90) my work group can easily get information on our purpose in the organization; (63) my company's managers and executives expect work groups to succeed; (52) my work group can easily get information from managers other than our direct supervisor; (92) my company's managers and executives align goals among different work areas; (91) my company's managers and executives develop performance review systems that help my group understand how to perform work; (67) my company's managers and executives are open to multiple perspectives -- such as different points of view; and (64) my work group uses its goals to guide decision-making.

The majority of items for factor five appear to be assessing the extent to which information is provided by the organization to align goals among organizational constituents. Compared to the original hypothesized scales, factor five seems to be primarily composed of items from the Executive Manager, Information, and Defining Performance scales. These results offer additional evidence that Information is an important aspect of organizational support. Additionally, information that aligns teams
with organizational goals and systems that align the work of multiple organizational constituents, appears to be a critical aspect of organizational support.

Factor Six: Integration Through Information Sharing

Factor six consists of the following items: (76) individuals on my group try to learn from other group members; (114) individual group members can easily share learnings -- such as new knowledge -- with other group members; (107) my direct supervisor involves the work group in decision-making; (86) our individual group members have clear priorities; (96) individuals on my group are skilled at doing their work; (94) my work group has meetings to share information; (106) my direct supervisor provides the time needed to meet group goals; (127) my work group can easily get information from our direct supervisor; (84) my direct supervisor helps our group work directly with other groups; (89) my group members have good people skills; (74) my work group makes day-to-day decisions about how work is done; and (85) my group can access experts from other work areas.

The majority of items for factor six appear to be assessing the extent to which information is used to integrate work between team members and between organizational constituents. Whereas factor four appears to represent information that aligns teams, factor five appears to represent teams' ability to integrate work with other organizational by sharing information. Compared to the original hypothesized scales, factor six seems to be primarily composed of items from the Information, Direct Supervisor, and Group Design scales. These results offer additional evidence that Information is an important aspect of organizational support. Additionally, information and other mechanisms which
facilitate information sharing between teams and other organizational constituents, appears to be a critical aspect of organizational support.

Factor Seven: Customer Participation

Factor seven consists of the following items: (116) others who depend on my work group -- such as customers or other groups -- help set my group's goals; (117) others who depend on my work group (such as customers or other groups) evaluate my group's performance; (130) my work group has meetings with suppliers to share information; (101) my direct supervisor sees our group as a customer; and (95) my company's managers and executives involve unions in the development of work groups.

Factor seven items appear to be assessing the extent to which members external to the team influence team performance. Compared to the original hypothesized scales, factor seven is composed of items from the Integration, Performance Appraisal, Executive Manager, and Direct Supervisor scales. These results suggest that external customer influence on team performance is an important aspect of organizational support.

Factor Eight: Integration Through Educational Events

Factor eight consists of the following items: (45) individual group members help set their individual goals; (35) my direct supervisor sets goals collaboratively with our group; (42) my company uses multi-functional (cross-disciplinary) groups to integrate work; (33) my group has the "big picture" of how work flows through our company; (47) my company's managers and executives see work groups as customers; (43) group members have the "big picture" of how work flows through my group; (32) my group routinely coordinates work with other work groups; (36) my work group can easily
collect, organize, and store information needed to perform our jobs; and (29) my company's managers and executives develop systems that help my group share information.

The majority of items for factor eight appear to be assessing the extent to which organizational constituents gain information about integration needs through organizational events, such as goal-setting and educational experiences. Compared to the original hypothesized scales, factor eight seems to be primarily composed of items from the Defining Performance, Integration, Executive Manager, and Information scales. These results suggest that an important aspect of organizational support is the development of experiences that educate team members on organizational integration needs.

Factor Nine

Factor nine consists of the following items: (145) when work is complicated or changes a lot, our group selects someone to help us work together; and (140) for our group, rewards depend more upon meeting group goals than individual goals. The underlying attribute of this factor is difficult to interpret. Additional analyses are needed to determine if these items represent a factor or if the items are better associated with different factors.

Factor Ten: Customer Information

Finally, factor ten consists of the following items: (44) my group works directly with customers; (27) my work group can easily get information about our customers; and (51) my work group has meetings with other groups to share information. The
majority of items for factor ten appear to be assessing the extent to which teams work directly with customers and other teams to share or obtain information. Compared to the original hypothesized scales, factor ten is composed of items from the Group Design, Information, and Integration scales. These results suggest that an important aspect of organizational support is the opportunity to work directly with customer and teams to obtain important work information.

Thus, results from the factor analysis provide partial support for the hypothesized Support Systems Survey scales. For example, with some exceptions, evidence suggests that the Performance Appraisal, Training, and Rewards scales are relatively "pure" measures of organizational support. However, items that make up the Group Design, Defining Performance, Direct Supervision, Information, and Integration scales appear to represent different underlying types of organizational support. For instance, goal-setting mechanisms appear to be complimented by mechanisms that provide resources to meet goals; mechanisms are needed to provide specific information on alignment needs (e.g., common goals among organizational constituents); teams need mechanisms that allow integration of work by sharing information with other teams; mechanisms are needed to allow individuals external to the team to influence team performance; events which educate team members on different types of organizational needs is another important aspect of organizational support; and mechanisms are needed that allow teams to obtain information about customers and other teams. Additional analyses with a larger ratio of subjects to items and which compares different extraction and rotation methods, may further clarify underlying dimensions of the Support Systems Survey scales.
APPENDIX L

PERCENTAGES OF INDIVIDUALS WITH ONE OR NO MISSING VALUES:

ALL SCALES
## Support System Survey: Presence

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## Support System Survey: Importance

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## Kirkman & Rosen's (1996) Empowerment Survey

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APPENDIX M

SUPPORT SYSTEM SCALES, EMPOWERMENT SCALES, AND PERCEPTION OF TEAM PERFORMANCE SCALES: NUMBER OF ITEMS RECODED AND SKEWNESS AND KURTOSIS OF SCALES BEFORE AND AFTER ITEMS ARE DROPPED
### Support System Scales, Number of Items Recoded and Skewness and Kurtosis Before and After Items are Dropped: Importance Scales

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* Indicates that the values remain unchanged

### Support System Scales, Number of Items Recoded, and Skewness and Kurtosis Before and After Items are Dropped: Presence Scales

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* Indicates that the values remain unchanged
Kirkman and Rosen's (1996) Empowerment Scales: Number of Items Recoded, and

### Skewness and Kurtosis Before and After Items are Dropped

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Modified Version of Beyerlein's (1996) Perception of Team Performance Scales:

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* Indicates that the values remain unchanged
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*Correlations > .11, p < .05; > .13, p < .01; > .17, p < .001. N equals 323 to 379*

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* Correlations > .11, p < .05; > .13, p < .01; > .17, p < .001. N equals 323 to 379.
REFERENCES


Fox, W. M. (1995). Sociotechnical system principles and guidelines: Past and

Addison-Wesley.


Galbraith, J. R. (1994). *Competing with flexible lateral organizations: second

established order. In J. R. Galbraith & E. E. Lawler, III (Eds.), *Organizing for the
Future: The New Logic for Managing Complex Organizations* (pp. 10-18). San


Rules for Effective Workplace Teams. New York: New Directions Management 
Services, Inc.

Herman, R. E. (1995) Turbulence! Challenges & opportunities in the world of 


flexibility. In E. H. Bowman & B. M. Kogut (Eds.), Redesigning the Firm (pp. 

Jackson, J. (1965). Social stratification, social norms, and roles. In I. D. Steiner 
& M. Fishbein (Eds.), Current Studies in Social Psychology (pp. 134-169). New York: 
Holt, Rinehart, and Winston, Inc.

New York: Wiley.

characteristics. Human Relations, 31, 703-725.

Katz, R. (1982). The effects of group longevity on project communication and 


Jerrell (Eds.), *Producing Useful Knowledge for Organizations* (pp. 221-244). New York: Praeger Publishers.


