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Will organizations expand their use of teams and teamwork mechanisms over the next ten years? This chapter examines the current use of teams and internal networked designs, and predicts that their use will grow. It briefly reviews the competitive and technological forces which have led to a resurgence of interest in teams and teamwork mechanisms. It discusses four types of team designs and the organizational and management practices that enable them to work. The chapter also makes some predictions about the future use of each type of team design.

Forces Encouraging The Use Of Teams

Teams and teamwork are in. Organizations have experienced a resurgence of interest in using teams and teamwork mechanisms as the basic performance building blocks. Although organizations have used teams to solve problems, coordinate activities, and accomplish tasks for quite some time, what has and will continue to change is their prominence and integration into the organizational structure and their scope of authority. (Drucker, 1988).

What has created this increased interest in teams and teamwork? At the most basic level, teams are established to create synergy--to increase the coordinated application of specialized knowledge so that the performance of the whole is greater than the sum of its parts (Ancona & Nadler, 1989). Competitive challenges and information technology demand the synergy that can be achieved through teamwork.

Competitive Challenges

The current competitive environment requires flexibility and speed. Flexible organizations place decision-making authority in the hands of those close to sources of information who have the expertise to interpret and act upon it. This is rarely an individual task, because changing technologies and markets have different impacts on organizational functions and disciplines. Speed provides a competitive advantage for those companies which shorten the length of their product development and process development cycles, and guarantee on-time delivery of products and services to customers (Stalk, 1988). Cross-functional product development teams can enable an organization to achieve a competitive advantage through speed by simultaneously developing products and manufacturing processes (Takuchi & Nonaka, 1986). Where time is short, individuals cannot accomplish much and organizations must use teams.

Of course, organizations still need to improve the quality of goods and services and increase operating efficiencies. The quality movement has identified "continuous improvement" of organizational processes as the key organizational strategy (Masaki, 1986). Continuous improvement is frequently accomplished through the use of teams: problem-solving teams, quality improvement teams, and cross-functional task forces. Self-managing teams have been used to improve efficiency, particularly in manufacturing settings. They take over many functions performed by first-level supervisors, thereby increasing supervisory spans of control and reducing costs.

The competitive challenges demanding flexibility, speed, quality, and efficiency have increased the interest and use of teams. The diffusion of advanced information technology has the potential to change the nature of teamwork.

Information Technology

Advanced information and automation technology transforms much work into knowledge work. The knowledge worker uses specialized knowledge to analyze data and make decisions. Computer analysis, computer-aided design systems, interactive technology, and expert systems extend the judgement, capabilities, and creativity of decision-makers (Applegate, Cash, & Mills, 1988). Computer technology extends the firm's capabilities to add value to products or services. For example, Toyota has a "Monday to Friday" design to delivery program in which a customer "designs his car" on a computer terminal on a Monday, and the factory automatically receives the specifications and has the manufacturing completed by Friday the same week (Davidson, 1990).

The opportunities for synergistic decision-making are significant. Specialists will need to collaborate to perform specific organizational tasks such as the introduction of new products or the design of customized services (Drucker, 1988). They will work on self-managing task-focused teams that disband once the job is done (Applegate, Cash, & Mills, 1988). Computer technology makes information widely available and distributes the ability to make informed decisions throughout an organization (Zuboff, 1988). Work becomes location-independent. Those with complementary skills can work together even though they are geographically disperse. The information and communication systems will permit input to be obtained, decisions to be made, and results to be tracked, without a team co-locating. Coordination between multiple task teams can occur through the use of computer and people networks. The networked organization links together potential contributors (Savage, 1990).

Future Directions

The competitive challenges and opportunities proffered by information technology have led to a resurgence of interest in teams and teamwork. Over the next decade, we can expect the competitive pressures demanding flexibility, speed, quality, and efficiency to intensify, requiring organizations to accelerate and broaden their implementation of team designs.

These forces will cause organizations to not only expand their use of teams, but to modify team designs. In general, organizations will move toward giving teams greater authority over their tasks. Team designs will rely more heavily on self- management. Self-management speeds up organizational decision- making, by permitting those with task-relevant expertise and information to make decisions, and not waste time referring decisions up an organizational hierarchy. As discussed in the employee involvement chapter, self-management is also favored by the American workforce. Organizations will provide teams with more autonomy because it is a source of competitive advantage.

Team designs will be modified in two countervailing directions. Where work can be self-contained and organized around products, customers, or services, relatively permanent, self-managed teams will be established. These teams will be the way that organizations get

some work done. They will be the basic performance unit for specified outputs. The reliance on relatively permanent self-managed teams to produce products or serve customers will eliminate overhead costs, because some supervisory and managerial positions will be able to be eliminated.

However, organizations will dramatically increase their use of temporary teams and loosely bounded networked structures. In a world that is rapidly changing, much work is temporary and non- routine. More of an organization's work will be handled using task forces and project-oriented teams. Because information technology enables teamwork to occur without team co-location, bounded teams will not have to be established in order to derive synergy from teamwork. New collaborative structures will be generated through linkages on distributed information networks. These structures will be highly fluid, flexible, and responsive to change.

In general, organizations will increase their use of teams and collaborative designs to be competitive. In the sections that follow, I will discuss four different types of team and networked designs, predict how each will be used in the future, and suggest how each team type should be designed and managed for team and organizational effectiveness.

Types Of Team Designs

Organizations today are using four types of collaborative and team designs. The first is collaborative networked designs which consist of the interactions and relationships among interdependent contributors or teams of contributors who cooperate to achieve an explicit purpose. The second is parallel team structures which exist separately from regular work activities and meet to recommend performance and quality improvements and solve business problems. The third is project and development teams which are assigned the responsibility for completing projects to fulfill users' requirements in a defined but typically extended period of time. The fourth is work teams that are responsible for producing a product or service.

These designs can be arrayed on a continuum from less formal and temporary to more formal and permanent. Networked designs build upon the informal organization and support task-focused collaboration. Linkages are temporary and change over time. Parallel team structures are usually temporary groups that supplement the formal organizational structure. Project and development teams are either overlays to a functional structure or integrated into a project organization. Although temporary, they tend to have a long life span. Finally, work teams are integrated into the formal structure and are permanent.

Networked Designs

Networked designs consist of the interactions or relationships among interdependent contributors or groups of contributors who cooperate to achieve a purpose. A network may be viewed as consisting of nodes or positions (occupied by individuals or groups) and links or ties manifested by interactions between the positions. Networks might be tight or loose depending upon the number, intensity, and type (closeness to core

activities of parties involved) of interactions between members (Thorelli, 1986). Not all pairs of nodes are directly linked; some are joined by multiple relationships (Tichy, Tushman, & Fombrun, 1979), and nodes and linkages change over time. The purpose of a network is its reason for existing and may consist of strategies, goals, objectives, or problems to be solved (Lipnack & Stamps, 1987).

Networked designs differ from the other team structures (parallel teams, project teams, and work teams) in their lack of clear boundaries between the network and organization. In contrast to the other team structures, networks are not self- contained. Membership is fluid and diffuse. Members cannot reliably identify the other members in the network and may be aware of only the participants with whom they have direct links. Work teams or project teams may comprise nodes of a network, but the network extends beyond team boundaries.

Examples of networked designs can be found in professional service companies such as investment banks or consulting firms and high technology companies--organizations which perform complex tasks and must adjust rapidly to changing market conditions and customer needs. Eccles and Crane (1987) describe the organization design of investment banks as a dynamic and flexible network, consisting of multiple client teams with functional specialists working on several teams, professionals having overlapping and shared responsibilities, dual reporting relationships, vague roles and responsibilities, and careers which involve cross-departmental movement. These characteristics all contribute to the formation of network ties.

Digital Equipment Corporation has conceptualized its organization and technology as comprised of networks--intelligent nodes linked together for a purpose. It describes the successful and timely introduction of the 6200 series of mid-range VAX as attributable to its organizational networked design--a distributed core group of 40-50 people located in 14 locations, with several thousand more participating indirectly, having firm agreement as to the goal and a distributed leadership structure.

Although several authors have suggested that networked designs are the wave of the future (Drucker, 1988; Miles, 1989; Naisbett, 1982; Savage, 1989), no studies have estimated their prevalence or evaluated their effectiveness. Thus, the discussion that follows about design features required for effectiveness is speculative. Table 1 presents an overview.

Characteristics of Networked Designs

The overarching purpose for the network should be explicit, clearly articulated, and engaging. Its purpose needs to be aligned with the organization's strategic objectives, so that the project fits within the organization's broader goals. Because the individuals and groups within the network (its nodes) will work on parts of the project, it is critical that they understand the relationship between their tasks and the network's overall objective. Without a clearly defined and articulated purpose, individual and group effort will not be integrated and sub- optimization will result.

The final output from the network should be identifiable, but may be distant from specific activities and linkages in the network. For example, investment bankers spend considerable time with each other and with clients to make sure they can provide significant amounts of information on market prices and trends, financing mechanisms, and merger and acquisition deals. However, their major task and the basis for payment is

the completion of investment deals. In order to increase the exchange of information, many investment banks define and measure desired output as total revenues earned from customers across deals over a period of time (Eccles & Crane, 1987).

Table 1
Networked Designs

Task:	Clear, explicit, overarching purpose
Composition:	Shifting membership Core and peripheral members Builds on informal organization Customer and supplier links Fuzzy boundaries
Authority:	Distributed Individual self-management
Leadership:	Distributed Governance structure and/or integrating roles
Performance Management and Reward Systems:	Support collaborative behavior Network accomplishment rewarded Lateral career movement
Education and Training:	Forums across organizational boundaries Problem-solving Intergroup relations and conflict-resolution Project and time management
Information Systems:	Infrastructure for networked design Virtual organizations Shared global data bases Computer-aided decision-making technologies

The composition of a network needs to be fluid and responsive to changing business and informational requirements. Changes in business conditions may require links to be made or broken, strengthened or weakened. Thus, the organization must support and manage a flexible allocation of human capital. The members of the network should have the specialized expertise to contribute to the network task, but have the willingness to cooperate across disciplines and functions. Members need to be brought into a network as their expertise is required and leave when they are no longer needed. This fluidity changes the concept of a job.

The network may consist of core and peripheral members, with tighter boundaries defined for core members. Core members are likely to have greater responsibility for accomplishing the network objective, while peripheral members provide information,

advice, or support. Core members of the network are likely to be located closer to the center of the network, with more linkages among them. Due to their centrality and access to information and resources, core members will be the most influential participants. In general, network members are part-time and are not co-located, although core members are occasionally full-time and co-located, depending upon complexity of the network project. Organizational members may participate in multiple networks simultaneously, depending upon their level of involvement.

The links forged for network accomplishment should build upon the informal organization. Contributors are most likely to coordinate with those they know, respect, and trust. They will seek the advice and assistance of those they perceive as influential, knowledgeable, and supportive. Personal relationships can help solidify the links in the network.

Networks have multiple links between those in the network and external constituencies such as customers, suppliers, and those providing professional support. The links are distributed and network members must be responsive to their key stakeholders making sure that appropriate external communication occurs. Internal network ties depend upon external linkages and can quickly change when business conditions or technology changes.

Network members need to take the initiative and responsibility for forging necessary relationships, sharing information, resolving conflicts, and achieving interdependent goals. In other words, the nodes of the network--both individuals and small groups--must be self-managing.

A networked design would intensify coordination costs and be unwieldy, if it did not distribute authority. Those with task expertise should be empowered to make critical business decisions, without relying on hierarchical intervention. Thus, the locus of decision-making authority must reside at the nodes of the network. Self-managing contributors have the responsibility to resolve problems with other self-managing contributors. They need to be responsible for monitoring their progress in the context of the overall purpose. They should be responsible for self-design by forging new links as necessary, discontinuing other links, and making sure that appropriate information exchange occurs.

The authority for establishing the overall purpose or conceptual framework for the network belongs to the organization's hierarchical decision-making structure or a specially constituted network governance structure. High technology companies frequently constitute special governance structures for managing complex product development efforts. For example, a "systems team" comprised of a core group of managers from product engineering, manufacturing, customer service and support engineering, and product management/marketing is given the responsibility to oversee the development of a new computer from the inception of a new product idea through market introduction. This group determines the initial high level specifications for the product and is ultimately responsible for its business success.

Network leadership tends to be multiple and distributed, although a variety of mechanisms can be used. A governance structure such as a "systems team" may be responsible for establishing the overall direction and developing the shared conceptual framework. Network leadership may be collectively shared by members of this governance structure. However, the organization may require an integrating role to be assigned such as

a project or network manager. This person assumes general management responsibilities for coordinating key decision- processes. She may need to act as a tie-breaker to speed decision-making.

Multiple leaders may direct different activities in the network. Leadership may be based on knowledge and task expertise, functional experience, and managerial position. Leadership may shift depending on project phase, technical requirements, and customer requirements. Leadership structures need to reflect the distributed composition and task assignments in the network.

The performance management and reward systems must support cooperative and self-managing behavior of organizational members. Cooperative or collaborative behavior should count for individual performance reviews. Making decisions at the source (with appropriate others) needs to be considered in performance reviews. Network performance management systems should recognize and reward collaborative behavior among interdependent performers. Because the final output from a network is likely to be distant from specific activities and linkages required for task accomplishment, performance management systems needs to recognize in-process activities, linkages, and accomplishments. Of course, final network accomplishment can also be recognized and rewarded.

Developmental activities should focus on building interdisciplinary expertise and increasing network ties. Job rotation training programs and lateral career movement develop general management perspectives and contribute to the formation of network ties. Individuals who have made lateral career moves become conduits of information between old and new departments.

Education and training programs should help participants form ties and integrate activities across interdependent disciplines, functions, levels, and locations. Thus, problem-solving, conflict-resolution, and intergroup relations training are helpful if provided in forums involving participants from multiple departments, disciplines, regions, countries, etc.

In addition, project management and time management skills may be critical for effective network participation. Individual contributors are likely to be involved with multiple projects and belong to multiple networks at the same time.

Information systems make network designs possible. People can communicate with one another and work together without having to locate together. Electronic mail and video-conferencing capability enable networks to be rapidly formed as "virtual organizations" without an investment in physical space and administrative support. These virtual organizations can be rapidly dissolved when the work is completed. Electronic mail and computer conferencing permit coordination to occur without having to develop new reporting relationships. Communication through electronic media tends to diminish the attention to status differentials and help decision-making to occur based on task expertise (Eveland & Bikson, 1989).

Information technology reduces the need for face-to-face interaction, but does not eliminate it. In early stages of a project when network members need to clarify the conceptual framework, goals, and methods of a project, extensive face-to- face communication is required (Galagher, 1990). Studies have suggested that participants prefer face-to-face interaction over computer-mediated communication at the initiation of a project (Bikson & Eveland, 1989). However, in later stages of a project, participants rely on

computer-mediated mechanisms that permit them to transmit text-graphic information in a form that can be easily understood and acted upon. Although participants may still need to meet occasionally during project execution, the need for face-to-face interaction is significantly reduced.

Information systems must contain global data bases in order for them to be useful to a dispersed network. It becomes important to define a limited core set of data elements that can be used by different functions. Network participants can identify additional core data elements that can be merged into an integrated data architecture, thereby expanding the architecture and developing agreed-upon meanings for the key terms (Savage, 1990). The use of a shared data base forces network participants to be explicit about conceptual frameworks and approaches, thereby integrating efforts and potentially speeding up progress on projects.

Shared global data bases enable connections to be made between participants from multiple disciplinary backgrounds and organizational homes. Multiple organizational logics can be integrated through the process used to define shared global data bases. In this way, networked designs use information technology as a substitute for the dual reporting structures found in matrix organizations. Rather than depending upon dual authority structures to integrate different organizational logics (for example product and function), information technology connects people from multiple structural bases and forces them to integrate efforts in pursuit of common goals.

Shared data bases also may also be helpful for communicating with external constituencies. They provide real-time on-line information exchange with customers, suppliers, and other key stakeholders. Network participants can respond quickly to external changes, if they are linked through technology to their key stakeholders.

Finally, computer-assisted decision-aiding technologies such as project management systems, expert systems, group and cooperative work systems extends the capability, creativity, and judgement of interdependent contributors. These tools enable dispersed self-management. More effective decision-making can take place where task expertise resides--at the nodes and links of the network.

In summary, networked designs depend upon collaboration among self-managing interdependent contributors. They build upon the strengths of the informal organization. They maximize the exchange of information and are flexible and responsive to business and technological changes. Networked designs can connect those with relevant task expertise independent of geography or organizational structure.

Their dispersed structure makes them difficult to control. Because networks frequently include participants from multiple locations and organizations, managers may be threatened by their inability to direct activities or provide "hands-on" supervision (Miles, 1989). Managers are likely to have difficulty keeping track of network activities. Participants may suffer from information overload. Managers may find it frightening to be responsible for outputs, and not have the people and processes under their control.

Effective networks do not happen automatically. They need to be designed, managed, and led. Without an integrating purpose and objectives, networks can fragment. Without supportive performance management, education, and information systems, participants will not be empowered to make effective decisions. Organizations must create the conditions that support interdependent, collaborative work. The benefits of enhanced flexibility are worth the costs in turbulent environments..

The Future

More organizations will intentionally create, manage, and support internal networks. Linking people with the right skill sets together will be critical for developing core competencies and perceived as too important to be left to the vagaries of the informal organization. Information and human technologies will be developed to enhance the development of linkages and successful collaboration among disparate contributors. Linkages will extend to include customers, suppliers, distributors, and other external partners. Organizations will struggle with adapting their formal structure and systems to support (and not be an obstacle to) network accomplishments. The organizations that are successful in managing multiple task-focused networks will achieve competitive advantage. The networked organization will be perceived as an information-age alternative to bureaucracy.

Parallel Team Structures

Parallel team structures are permanent or temporary structures that supplement the normal work structures and perform functions that the regular organization is not equipped to perform well (Mohrman & Lawler, 1988; Stein & Kanter, 1980). Examples of parallel structures include problem-solving teams, quality circles, quality improvement teams, productivity improvement groups, employee participation teams, and task forces. In contrast to networked designs, parallel team structures have clear boundaries: members both inside and outside a team can identify the team and reliably distinguish members from non-members. Parallel team structures may be established to make recommend improvements or solve specified business problems.

Typically, these teams make recommendations that are considered by the hierarchical decision-making structure. No change results unless the recommendations are approved by the hierarchy (Lawler & Mohrman, 1987). This process takes time, adds to overhead costs, and places the locus of decision-making authority distant from those with task expertise. These teams usually meet regularly (each week or two) and may follow a defined problem-solving or quality improvement process. Participants are trained in the use of the processes that the organization adopts--for example, problem-solving, quality improvement, and group interaction skills.

Currently, organizations tend to implement parallel team structures more frequently than other team-based designs. The 1987 GAO study of the employee involvement practices in Fortune 1000 companies indicated that approximately 70% of the companies sampled use quality circles or employee participation groups. Their use tends to be limited to less than half of the workforce (Lawler, Ledford, & Mohrman, 1989). Just about all organizations use task forces to solve problems that the regular organization cannot handle, but only a small percentage of employees are involved in task force activity at any given time.

The widespread use of parallel team structures has occurred because they are easy to install and require no shifts in managerial power and authority or changes in organizational structure. However, parallel teams have difficulty achieving organizational legitimacy and most compete with the regular organization for time, money, information, and other resources. They are difficult to sustain and may introduce conflict between those involved in these teams and those who are not. Middle managers and staff professionals

who are required to respond to recommendations and implement them, often have not been involved with the teams, have competing objectives, and perceive these recommendations as treading on their turf in U. S. companies. (Lawler, Ledford, & Mohrman, 1989; Lawler & Mohrman, 1987). In contrast, Japanese companies and transplants implement a much higher percentage of quality circle suggestions than their American counterparts (MacDuffie, 1988). Despite the testimonials for their success reported in the practitioner literature, there is little empirical evidence regarding the performance effectiveness of parallel team structures. The empirical evidence, that exists, is equivocal (Ledford, Lawler, & Mohrman, 1988).

Task forces are parallel structures, but they differ from quality circles or problem-solving teams in four ways. Typically, task forces are asked to recommend solutions to specific business problems rather than being charged with a general mandate such as generate ideas for improving quality. Membership may be assigned rather than voluntary. They usually have specific deadlines for accomplishing their task and are established as temporary groups. Finally, task forces are used at any level in the hierarchy. Managers are just as likely to be members of business task forces as the rank and file. Thus, task forces tend to be more integrated into an organization's functioning than other parallel structures.

Organizations use task forces frequently because they are a relatively easy way to obtain the synergy required to depart from routine ways of doing things. They bring together those with necessary expertise and provide opportunities for development and organizational learning. They enable an organization to focus on time-limited tasks. They are flexible and responsive to change.

Characteristics of Parallel Team Structures

The research on quality circles provides a picture of the design features that contribute to effective parallel team structures (Ledford, Lawler, & Mohrman, 1988; Mohrman & Ledford, 1984). Table 2 presents an overview.

Parallel teams need to be comprised of members that have the expertise to successfully address the issues they choose. Because most parallel teams are comprised of volunteers, training and the availability of expert resources is critical. Organizations that provide extensive training and encourage their professional and support staffs to meet with teams as needed, have the most successful parallel team structures. The typical problem-solving or group process training should be supplemented by business and economic education, so that employees will generate recommendations for improvement that economically make sense. In order to minimize "in-group" "out-group" tensions, organizations should provide opportunities for everyone to join parallel team structures. However, this does not mean that members cannot be selected for task force participation, based on their expertise and background. If organizations make wide usage of task forces, employees will eventually have the opportunity to serve on them, and membership opportunities will be perceived as open..

Parallel teams should make sure that their activities are closely linked to performance goals. This is important both for the teams that determine what issues they will address and those that are assigned specific problems. Task forces that address non-routine problems should struggle with defining metrics. Defining objectives and measures helps to align task force activity with customer and business requirements.

Table 2 Parallel Team Structures	
Task:	Generate improvements or solve specified problems Explicit link between group task and measurable performance indicators
Composition:	Availability of membership opportunities Members expertise
Authority:	Suggestion authority Explicit management-level mechanism to respond to suggestions
Leadership:	Facilitation of meetings Participative and coaching skills Linkage with outside constituencies
Training:	Problem-solving Group process skills Quality improvement methods Economic and business education
Rewards:	Management recognition and support Gainsharing
Information:	Regular communication (internal and external) Regular record keeping Access to business information
Outside Assistance:	Availability of expert resources as needed
Timing:	Outside intervention most useful at beginning and mid-point for time-limited projects

Because parallel team structures can only make recommendations, it is critical that the organization sets up explicit mechanisms to respond to them. This is likely to be management-level groups or steering committees for quality circles or quality improvement teams. It can be the management sponsors for task force activity. The team should know the criteria for evaluating its recommendations and who will be the decision-makers. Although obvious, this is not always done.

The leadership requirements include facilitating meetings, coaching team members, providing links to management and outside constituencies, obtaining training and other

resources. Parallel team structures frequently use a facilitator to perform these functions, although supervisors and managers also perform these roles.

Financial rewards are usually not offered to participants in parallel team structures. However, financial rewards such as gainsharing could be used to reinforce team activities (Lawler & Mohrman, 1987). Recognition events (lunches, t-shirts, plaques, and pins) are frequently used and have limited motivational value. Management responsiveness to parallel team recommendations is the most critical support for parallel team participation.

Communication is critical. It is important for parallel teams to communicate progress to sponsors and other interested stakeholders. Parallel teams need to keep good written records such as meeting agendas, minutes, and action items. In general, written records helps teams use time efficiently, track progress, and have effective meetings.

Finally, temporary parallel structures that have specific deadlines for task completion must manage time. Gersick's (1988) study of eight task forces[1] found that they established an initial direction at their first meeting which they followed until half their time elapsed. At their midpoint, they changed their work patterns, re-engaged with outside managers, developed new understandings of their work, and made dramatic progress. Her study suggests that managers need to carefully plan for a task force's first meeting, because it will set a lasting precedent for how the task force goes about its work. It suggests also that the mid-point is a time in which the team will be especially open to outside assistance and information, and this input can help the team to revise its framework and generate a final product aligned with the organization's objectives.

Parallel team structures require ongoing care and nurturance. Yet, they can be useful mechanisms for expanding participation, generating improvement ideas, and solving problems.

Future Directions

Organizations will continue to expand their use of parallel team structures. Quality improvement teams, problem-solving teams, employee participation teams, and task forces will be used throughout organizations. Although the use of quality circles is waning, the use of quality improvement teams will continue to grow. The quality movement is still on the upswing in the U.S. Regardless of which quality program an organization selects, teams are used as the vehicle to recommend quality improvement ideas. The use of task forces will also grow. Organizations will continue to have problems that cannot be addressed by the normal structure and require special attention. The flexibility of the task force structure makes it particularly suitable and efficient in turbulent environments; when a problem is identified, a task force can be established; when the problem is resolved, the task force disbands. Few doubt that organizational environments will only become more turbulent in the next decade.

New types of parallel structures may emerge--focused on increasing decision-making speed and responsiveness to internal and external customers. New problem-solving technologies and tools intended to enhance decision-making speed and execution will be developed. These will be based on computer technologies. Already "groupware" business programs are being developed to enhance decision-making of business support teams

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[1] Gersick did not differentiate between task forces and project teams in her sample. However, the groups she examined met for six months or less and tended to be parallel structures.

(Johansen, 1988). The new automated tools will complement existing quality improvement tools such as pareto analysis and statistical process analysis. Although the particular forms or names may change, organizations will continue to use parallel team structures to supplement their normal decision-making processes.

Project And Development Teams

Project and development teams have been used by organizations for quite some time. Members, typically white- collar professionals such as engineers, designers, and researchers, are brought together to conduct projects to fulfill users requirements in a defined but typically extended period of time. Examples include new product development teams, information systems teams, research and development teams, and new factory design teams.

Project teams are assigned unique, uncertain tasks, and are expected to create non-routine products. Thus, they cannot rely on standardized procedures, because they are creating something new (Gersick & Davis-Sacks, 1990). Their products are identifiable and measurable, but measurement may be difficult due to the output's uniqueness. For example, the degree to which a new product meets the requirements of customers may not be known for several years.

Project teams usually have broad mandates and considerable authority. They are assigned responsibility to make key decisions within broad strategic parameters. Within these parameters, they typically are free to define the conceptual framework for the project, project objectives, and methods for accomplishing tasks. Thus, project teams are self-managing. It is not possible to solve non-routine problems or create innovative products without having the autonomy to exercise judgment.

However, a project team also responds to the requirements of its sponsor and customers for its work. Thus, it balances its needs for independent thinking with responsiveness to key stakeholders, and makes sure that appropriate external communication occurs (Ancona & Caldwell, 1988; Gersick & Davis- Sacks, 1990) If the project team's decisions are not aligned with the firm's strategic objectives and its customer's requirements, then it is unlikely to be successful.

Project teams differ from task forces in three ways. Their work tends to be integrated into the workflow of the enterprise. For example, new product development is a basic business activity of all high technology companies. They tend to have the authority to make decisions rather than just recommendations. Finally, their life span tends to be longer in duration than the prototypical task force. Thus, project teams usually are not parallel structures.

However, these distinctions may not hold up in actual practice. If a task force's work is integrated into the actual business and it has the authority to make decisions rather than just recommendations, then it is more like a project and development team than a parallel structure. Many task forces fall in the middle of a continuum between parallel structures and project and development teams. Task forces are strengthened if they are designed and managed like project teams.

Characteristics of Project Teams

The characteristics of project teams are summarized in Table 3 In general, organizations can build and sustain effective project teams by providing contextual supports and helping teams deal with the values and technical conflicts that arise from heterogeneity of membership.

Table 3
Project and Development Teams

Task:	Conduct projects to meet user requirements in specified time period
Composition:	Relatively fixed Most necessary competencies within team Members from different backgrounds and organizational units
Authority:	Broad mandates within prespecified constraints Self-managing to self-directing
Leadership:	Clarify direction Align efforts Make sure appropriate expertise is applied, Monitor progress Obtain needed resources
Performance Management:	Group performance metrics Individual performance reviews consider project accomplishment
Rewards	Group-level performance rewards and recognition
Training:	Basic problem-solving Conflict-resolution skills
Information:	Task requirements and constraints Available resources
Timing:	Multiple phases Intervention most useful at beginning and mid-point of each phase
External Relationships:	Links with customers, suppliers, and sponsors critical for project implementation

Project team members do not typically work together but come together to perform the team task from different jobs, roles, departments, functions, and business units (Gersick & Davis-Sacks, 1990). The composition of project teams should be relatively fixed, with most necessary competencies located within the team. Members can either be full or part-time, and the project team can consist of a combination of a few full-time core members, and a majority of part-time members (Galbraith, 1973). Depending on the project and the size of the team, members may or may not need to be co-located.

The function and role of the project leader depends upon the group's authority, the nature of the project, and the culture of the organization. In general, the project leader should be able to help the team understand its direction, help the team align its efforts with the organization's strategic objectives, help to make sure that appropriate expertise is brought to bear, and make sure that appropriate links with key stakeholders exist. The leader may have to act as a tie-breaker to speed decision-making as well. Thus, the task group leader should have organizational credibility, appropriate expertise, and access to information and resources.

A variety of leadership mechanisms can be used. If organizational credibility is dependent upon rank and the group has decision-making authority, a senior-level project manager will need to be assigned. A less senior project manager will suffice for less critical tasks, or in organizations where rank is less critical for getting the job done. Some project teams may be able to select leaders from inside the group, and leadership can change depending upon the task. In general, what matters is not the position per se, but whether project leadership enables the group to complete its project by its deadline and obtain the support from key organizational stakeholders.

The organization's performance management and reward system will communicate a message about the value of project work. At the minimum, project participation should count for individual performance reviews and rewards. Group performance can be recognized and rewarded as well. Group performance goals need to defined and outcomes evaluated. The relatively clear objectives and timelines inherent in project team activity provides a performance advantage by motivating members and structuring work (Hackman, 1990). The organization should use its performance management system to capitalize on this feature of project team work.

The training for project participants can build upon the training provided for parallel structures. Indeed, problem- solving skills and group interaction skills are appropriate for helping individuals work effectively in groups. However, project teams that cut across functional and disciplinary areas may need special training, so that members appreciate their differing perspectives, communicate effectively across disciplinary, functional, and geographic lines, and resolve conflicts. The ability to resolve conflicts expeditiously and quickly can be a competitive advantage.

Project teams must have the information they need for their project. Although this is a common-sense notion, it is frequently violated (Galbraith, 1973). This can include information about task requirements and constraints, available resources, and technical requirements. Organizational information systems need to provide useful project data. Reconfiguring an information system to support projects can be a huge investment, if the information system was previously designed to support the functional organization.

Project teams need to manage schedules and times. Because of the complexity and long life cycles of many projects, interim milestones become critical. Projects may consist of

multiple distinct phases. The framework that is established at the beginning of the whole project sets the context for later phases. Similarly, the halfway point of the entire project may be the most critical time for evaluating project progress and making major changes (Gersick, 1988). However, the beginning and mid- point of each phase provide opportunities for intervention and correction. Thus, project managers need to be especially aware of the opportunities implicit in a project's life cycle and the passage of time.

Organizations will not have project teams that meet today's business objectives, without the leadership, training, information, and rewards needed to support them. The reliance on good people and hard work is not sufficient in this competitive environment.

The Future

Organizations will continue to use project teams to complete complex projects critical for their success. What will be new is the way that project teams operate so that they meet competitive requirements for speed and flexibility. The degree of self-management will expand. Project teams will be expected to resolve major disagreements without taking the time to use an escalation process. The autonomy given to project teams to develop concepts that fit a general strategic direction will motivate teams to transcend previous technical limitations. Project teams will fail unless they are comprised of members with very high technical skills and conflict-resolution abilities. The capacity to go beyond disciplines and functions, and understand trade-offs required for success in the marketplace will be critical. Organizations will take steps to align their structures and systems to better support integrated project team efforts. More organizations will begin to hold project team members accountable for overall project success and not just for functional contributions. More work will be project-oriented with jobs consisting of participation in a series of project teams. Project management systems will be used to coordinate a series of project efforts and to track the development of key project competencies. Managers will be responsible for coordinating the flow of people and work (Drucker, 1989; Savage, 1990).

Work Teams

Work teams are responsible for producing a product or service. In contrast to parallel team structures or project teams, they perform regular, ongoing work. Although work teams can be traditional groups using external forms of control (for example, assembly line groups), we will focus here on self- managing groups where the team has the autonomy to make most decisions associated with production or service activities. A self-managing team may be responsible for its own support services such as maintenance, purchasing, and quality control, and may perform certain personnel functions such as hiring and firing team members, determining bonuses, and pay increases. Self-managing teams are sometimes called autonomous work groups, semi-autonomous work groups, self-regulating groups, and self- designing groups.

Self-managing work teams are most frequently found in manufacturing settings, although this team design is applicable to any situation in which a group of people are interdependent and thus can be made collectively responsible for producing a product or providing a service to an external or internal customer. Examples include production teams, assembly teams, administrative support teams, customer sales and service teams, professional support teams, and management teams. An executive team, whose members

are collectively responsible for the internal operations of the company and have shared performance goals, is a self-managing team.

Self-managing work teams have been implemented by those organizations using a socio-technical or a job enrichment approach. Their design is intended to jointly optimize the organization's social and technical systems (Cummings, 1978). They are posited to work because this way of organizing work is intrinsically motivating and satisfying, increases the level of effort, knowledge, and appropriateness of task performance strategies applied to the collective task (Hackman, 1987), and helps to reduce unnecessary overhead costs. Both socio-technical approaches and job design theory suggest the same causal mechanisms, and some have argued for a synthesis of the two approaches (Rousseau, 1977; Cummings, 1978; and Denison, 1982). High commitment organizations, interested in maximizing the level of employee involvement, tend to use self-managing work teams (Walton, 1980).

The 1987 GAO study found that twenty-eight percent of Fortune 1000 companies use self-managing teams. Where these have been implemented, the vast majority have been limited to involving less than 20% of the workforce. Most of these applications have been in manufacturing using first-level employees. 25% of the service companies in the sample (as compared to 36% of the manufacturing firms) used self-managing team designs. 23% of the companies surveyed indicate that they plan to expand their use of self-managing teams in the next two years (Lawler, et. al, 1989). Another study of the Fortune Service 500 and Industrial 500 revealed that 25% of these companies used executive-level teams in the 1980-1984 period (Vancil, 1987). I am not aware of any studies that have been done to estimate the use of self-managing teams in sales, professional support, or middle management areas.

Although the use of self-managing teams appears to be growing, research on their effectiveness has been limited. Many studies lack the controls necessary to draw causal inferences (Wall, Kemp, Jackson, & Clegg, 1986). However, some careful documented individual firm studies of self-managing teams (Walton, 1972; Goodman, 1979; Wall et. al 1986) and several meta- analyses (Macy et. al, 1986; Guzzo, Jette, and Katzell, 1985; Roitmann & Gottschalk, 1984) have been performed. In a review of these studies, Goodman, Devadas, & Hughson (1988) conclude that self-managing teams have a modest impact on productivity, positively change some specific attitudes of team members, and can improve safety. The data on absenteeism and turnover are equivocal, and few cost-benefit analyses have been done. Other studies have found self-managing teams to produce a high concern for quality (Cummins & Molloy, 1977).

In a recent study comparing 63 matched pairs of self- managing teams to traditionally-managed teams that perform the same work in a telephone company, we found that self-managing teams were rated as higher in effectiveness (productivity, costs, customer service, quality, and safety) than their matched pairs by both members and upper level managers. Participants of self- managing groups evaluated them as higher in quality of work life outcomes such as growth satisfaction, social satisfaction, and trust than participants of traditionally-managed groups (Cohen & Ledford, 1990). No significant differences were found in absenteeism. In general, the findings from this study are consistent with Goodman et. al's (1988) conclusions.

Given that self-managing teams have positive, albeit modest, effects on performance effectiveness and quality of work life outcomes, it is important to identify the mechanisms that make them work, and what can be done to make them more effective.

Characteristics of Self-Managing Teams

Table 4 provides an overview of the features that enable self-managing work teams to be effective. A self-managing team needs to be composed of members with the necessary technical and interpersonal skills. Members need to have a variety of skills so that they can perform most or all of the team tasks. Usually members need to be assigned to the team full-time and co-located. The size of the team is ideally the smallest number required to do the task (Hackman, 1987). Members may rotate through different tasks to learn new skills, increase flexibility, and remain challenged by their jobs. Self-managing teams can be easily identified by others in the organization because their composition is fixed.

Table 4
Self-Managing Work Teams

Task:	Produce a product or provide a service
Composition:	Stable Most necessary competencies within team Members full-time and co-located
Authority:	Ranges from self-managing to self-designing
Leadership:	Supervisor as coach Encourage self-managing behaviors Align and coordinate team efforts Boundary spanner
Performance Management and Rewards:	Group-level performance metrics Group-level rewards and recognition Skill-based pay
Education and Training:	Team-building activities Problem-solving Conflict-resolution Cross-training Business and economic education Role of supervisor
Information:	Task requirements and constraints Business and economic information On-line linkages to customer and supplier information
External Relationships:	Clear links to suppliers and customers

At minimum, a self-managing group needs to have the authority to determine how to execute its task. Authority can extend to determining performance goals for the team and being responsible for the design of the team itself (its composition, structure, rewards, etc.). Teams with control over their own design have sometimes been called self-designing teams (Hackman, 1987). Management teams and professional support teams are more likely to be self-designing than production, administrative support, or service teams. It takes additional knowledge, skill, and maturity to be a self-designing team--for example, to appropriately determine performance goals, to hire and fire members, and to determine team rewards. Most organizations are reluctant to make this investment and transform power relationships this significantly.

The position and role of the team's leader depends upon the organization's distribution of authority, its culture, and the maturity of the group. Frequently, the immediate supervisor is defined as a coach and given wider spans of control, or the responsibility for coordinating more than one work team. A supervisor's position may be eliminated, with the team reporting directly to the next level manager. The members of the team may be responsible for leadership roles, and assignments may be permanent or rotating. The leader of a work team should foster self-management by encouraging the group to set goals, have high expectations, monitor its performance, etc. (Manz & Sims, 1987). The leader should help the team align its efforts with business objectives and help it coordinate its activities with other teams and organizational stakeholders. The leader should not perform traditional supervisory functions which can be handled by the team. The most reliable cost savings from self-managing teams are associated with the removal of unnecessary management layers.

The organization's performance management and reward systems should be designed to support collective effort. Group performance goals need to be defined and measured, with accurate, timely, performance feedback shared with the team. The team may participate in setting its performance goals, with input from its customers and managers. Team members may conduct peer evaluations that assess the degree to which individuals have contributed to team goals.

Performance rewards and recognition should be based on the accomplishment of the team task. These can include financial incentives or public recognition contingent on group performance. Managers should provide the reward to the group as an intact unit and not attempt to differentiate individual performance, because competition for valued rewards can result in divisiveness that undermines collective effort (Hackman, 1987). However, a mature self-managing group may be able to use a peer evaluation system to differentiate individual rewards based on contributions to the group. In this case, some combination of group rewards and individually-based contingent rewards makes sense.

Finally, skill-based pay systems have been used quite successfully with self-managing work teams. Under skill-based pay systems, employees are paid for skills they can perform, rather than the specific job they are performing at a given point in time. Skill-based pay encourages flexibility and self- management by giving employees an incentive to learn a variety of jobs and increasing knowledge of the production or service process (Ledford & Bergel, 1991). A skill-based pay system can be easily used in conjunction with group-based performance incentives.

The training provided to work teams should ensure that participants have the wherewithal to perform the collective task. Training may include social interaction skills, technical skills, and business knowledge. Similar to the training provided to parallel teams

and project teams, team-building activities and training in problem-solving, group interaction skills, and conflict-resolution can help members work effectively in groups. Cross-training can provide a work team with the flexibility of its members knowing a variety of jobs, and may be part of a skill-based pay certification process. Training in quality analysis or statistical process control can help a team to better monitor and improve its processes. Business and economic education can help a team to understand its activities in the context of business goals and financial performance.

Managers of self-managing work teams may need assistance in understanding their new role. Simply telling managers to become "coaches" or "facilitators" rather than bosses may not be sufficient to support behavior change (Rosow, 1989). Instead, managers may need help in understanding the specific requirements of their new roles and training to improve their participation and delegation skills. If the role of the manager is to encourage self-management, then the manager must have the skills to perform the requisite behaviors, such as encouraging goal- setting or self-evaluation (Manz & Sims, 1987). Training can help managers more effectively support self-managing work teams.

Whether or not training is delivered in the classroom or more informally on-the-job depends upon the requirements of the task, the team's educational needs, and the number of teams within the organization. The content of the training should depend also on the team's needs for additional expertise. Whatever the content or mechanism used to deliver the training, what matters is enabling self-managing work teams to be excellent performers (Hackman, 1987).

Finally, self-managing work teams need to be supported by the information systems of the organization. They require information about task requirements and constraints, customers' requirements, available resources, and performance standards (Hackman, 1983). In addition, information systems can provide real time on-line linkages to customers, suppliers, and those with needed expertise. Information systems should be used to provide on-line performance feedback on the team's results. Information systems can provide analytical assistance and the capacity to simulate the consequences of different performance strategies. Without appropriate information, team decision- making will suffer.

Work teams need clear links to their suppliers, customers, and those who provide support. Because a team's work consists of a process of receiving materials or information from suppliers, transforming or adding value to what is received, and delivering output to team customers, coordination with external parties is crucial (Sundstrom, Meuse, & Futrell, 1990).

Self-managing teams are not easy to implement. They require organizational changes and investments of time and resources in order to make them work. Without changes in job design, work may not be organized so that a team is collectively responsible for a product or service. Without changes in management philosophy, a team may not be given the authority to make decisions about how to execute its task. Without additional training, managers may not be able to provide coaching to a self-managing team and may undermine its efforts. The reward, education, and information systems may need to be modified to support effective teamwork. These changes and contextual supports require organizational commitment and investment. Without the willingness to make this investment, an organization is unlikely to sustain the performance and quality benefits that can arise from the implementation of work teams.

Once self-managing teams are implemented and supported by the organization's reward, education, and information systems, they become relatively easy to sustain. They create a momentum of their own. This strength can become a weakness, if change needs to occur. The mature self-managing team is a relatively self-contained unit with a team identify and modus operandi. Members may be unwilling to transfer to other teams, even if marketplace demands require different assignment of resources. They may be unwilling to apply different methods to team tasks, once habitual patterns have been established. This can be managed to some extent by providing teams with ongoing performance and customer feedback, making sure that team representatives participate in forums with representatives of other teams, and providing rotational opportunities.

The Future

More organizations will use self-managing teams in their manufacturing plants. High involvement plants which use self- managing teams as their basic performance unit will be more efficient and effective than competitors. This performance advantage will contribute to the diffusion of this work design..

The organizations which have successfully implemented self- managing teams in manufacturing operations will begin to apply this technology to administrative support functions, customer service functions, some management, and professional support areas. These organizations hope to derive the productivity benefits, quality improvements, and cost savings in service and support functions that they have already achieved in their factories. As organizations delayer and downsize, self-managing teams will be viewed as potential substitutes for excess staff or management.

The next ten years will be characterized by considerable experimentation in adapting self-managing work team designs to white collar areas. This design will be appropriate only for those functions that can be self-contained based upon products or customers. Where implemented successfully, self-managing work teams will result in increased efficiency and effectiveness. It will provide those firms which have implemented this design in multiple areas a competitive advantage.

However, failures will occur. Self-managing work team designs are not appropriate for situations which do not provide ongoing services or products to internal or external customers. They are not appropriate for tasks that cannot be self-contained. They are not appropriate for short-term projects. The organizations that do not base their team design on an analysis of the work to be done, but simply imitate the design of self- managing teams used in manufacturing for their service, support, and management functions will have a preponderance of failures.

Implementation failures may occur in situations in which self-managing work teams are an appropriate design for the tasks to be completed. Resistance may occur from professionals and managers who perceive this work design as diminishing their individual autonomy and discretion. Many professionals have been socialized to expect considerable individual discretion and may be reluctant to subject themselves to collective authority. Organizations will need to work with the groups that are potentially threatened by this work design, and help them to perceive that the benefits of belonging to a team may be greater than the costs of reducing individual discretion.

Teams And Teamwork: Conclusions

This chapter has addressed the use of teams and internal organizational networks. The chapter asserts that organizations will sustain and increase their interest in teams and networked designs over the next decade. A growing number of organizations will involve an increased percentage of their workforce in networked designs, parallel team structures, project teams, and work teams, as a response to competitive forces and the implementation of information technologies.

However, teams and networks will have to managed. They will need to be designed to fit the work to be accomplished. They will need to be supported by organizational systems and practices including performance management and reward systems, education and training, information systems, and management practices.

The future demands empowerment and flexibility. Thus, the participants in teams and networks will have decision-making authority. The future team and networked designs will be self- managing. Temporary and fluid designs will dominate the organizational landscape. Organizations will use work teams where tasks can be self-contained. Project teams and internal networks will be responsible for accomplishing the work in the remainder of the organization. Organizations will continually initiate, disband, and modify project teams and networked designs. Managing the changing configuration of flexible structures will be the challenge of this next decade.

References

Ancona, D.G. & Caldwell, D.F. (1988). Beyond task and maintenance: Defining external functions in groups. *Group and Organization Studies*, 13, 468-494.

Ancona, D.G. & Nadler, D.A., (1989). Top hats and executive tales: Designing the senior team. *Sloan Management Review*, 19, Fall.

Applegate, L.M. Cash, J.I. & Mills, D.Q. (1988). Information technology and tomorrow's manager. *Harvard Business Review*, November-December, 128-136.

Bikson, T.K. & Eveland, J.D. (1990). The interplay of work group structures and computer support. In J. Galagher, R.E. Krauit, & C. Egido (Eds.), *Intellectual teamwork: The social and technological bases of cooperative work.* Hillsdale, N.J.: Lawrence Erlbaum Associates.

Cohen, S. & Ledford, G.E. Jr. (1990, August). The effectiveness of self-managing teams in service and support functions: A field experiment. Paper presented at the Academy of Management Annual Meeting, San Francisco.

Cummings, T.G. (1978). Self-regulating work groups: A socio-technical synthesis. *Academy of Management Review*, July, 625-634.

Cummins, T.G. & Molloy, E.S. (1977). *Improving productivity and the quality of work life.* New York: Praeger Publishers.

Davidson, (1990). Comments from presentation at University of Southern California, Human Resource Executive Conference.

Denison, D.R. (1982). Sociotechnical design and self-managing work groups: The impact of control. *Journal of Occupational Behavior*, 3, 297-314.

Drucker, P.F. (1988). The coming of the new organization, *Harvard Business Review*, 66:5, January-February, 45-53.

Eccles, R.G. & Crane, D.B. (1987). Managing through networks in investment banking. *California Management Review*, Fall, 176-195.

Eveland, J.D. & Bikson, T.K. (1989). Work group structures and computer support: A field experiment. Technical Report. Santa Monica, Ca.: Rand Corporation.

Galbraith, J. (1973). *Designing complex organizations.* Reading, Mass: Addison-Wesley Publishing Company.

Galagher, J. (1990). Intellectual teamwork and information technology: The roles of information systems in collaborative intellectual work. In J.S. Carroll (Ed.), *Applied social psychology and organizational settings*. Hillsdale, N.J.: Lawrence Erlbaum Associates, 193-216.

Gersick, C.J. (1988). Time and transition in work teams: Toward a new model of group development. *Academy of Management Journal*, 31:1, 9-41.

Gersick, C.J. & Davis-Sacks, M.L. (1990). Summary: Task forces. In J.R. Hackman, (Ed.), *Groups that work (and those that don't): Creating conditions for effective teamwork.* San Francisco, California: Jossey-Bass, 146-154.

Goodman, P. (1979). *Assessing organizational change: The Rushton quality of work experiment*. New York: Wiley-Interscience.

Goodman, P.S., Devadas, R., & Hughson, T.G. (1988). Groups and productivity: Analyzing the effectiveness of self-managing teams. In (Eds.), J.P. Campbell, R.J. Campbell, and Associates, *Productivity in organizations*. San Francisco, California, 295-327.

Guzzo, R.A. Jette, R.D. & Katzell, R.A. (1985). The effects of psychologically based intervention programs on worker productivity: A meta-analysis. *Personnel Psychology*, 38, 275-291.

Hackman, J.R. (1987). The design of work teams. In J.W. Lorsch (Ed.), *Handbook of organizational behavior*. Englewood Cliffs, N.J.: Prentice-Hall.

Hackman, J.R. (1990). Conclusion: Creating more effective work groups in organizations. In J.R. Hackman (Ed.), *Groups that work (and those that don't): Creating conditions for effective teamwork.* San Francisco: Jossey-Bass.

Johansen, R. (1988). *Groupware: Computer support for business teams*. New York, N.Y.: The Free Press.

Lawler, E.E. III, Ledford, G.E. Jr., & Mohrman, S.A. (1989). *Employee involvement in America: A study of contemporary practice*. Houston, Texas: American Productivity and Quality Center.

Lawler, E.E. III, & Mohrman, S.A. (1987). Quality circles after the honeymoon. *Organizational Dynamics*, 42-54.

Ledford, G.E. Jr., Lawler, E.E. III & Mohrman, S.A. (1988). The quality circle and its variations. In (Eds.), J.P. Campbell, R.J. Campbell, and Associates, *Productivity in organizations*. San Francisco: Jossey-Bass, 255-294.

Ledford, G.E. Jr. & Bergel. (1991). Paying for skills in two food processing plants. *Compensation and Benefits Review*, In press.

Lipnack, J. & Stamps, J. (1987). A network model. *The Futurist*, 21:4, July-August.

Macy, B.A. and others. (1986). Meta-analysis of United States empirical organizational change and work innovation field experiments: Methodology and preliminary results. Paper presented at the Annual Academy of Management Meeting, Chicago, Illinois.

MacDuffie, J. P. (1988). The Japanese auto transplants: Challenges to conventional wisdom. ILR Report 26, 12-18.

Manz, C.C. & Sims, H.P. (1987). Leading workers to lead themselves: The external leadership of self-managing work teams. *Administrative Science Quarterly*, 32, 106-128.

Masaki, I. (1986). *Kaizen: The key to Japan's competitive success*. New York: Random House Business Division.

Miles, R.E. (1989). Adapting to technology and competition: A new industrial relations system for the 21st century. *California Management Review*, Winter, 9-28.

Mohrman, S.A. & Lawler, E.E. III (1988). Parallel participation structures, CEO Technical Report.

Mohrman, S.A. & Ledford, G.E. Jr. (1985). The design and use of effective employee participation groups. *Human Resource Management*, 24, 413-428.

Naisbett, J. (1982). *Megatrends*. New York: Warner Books.

Roitman, D., & Gottschalk, R. (1984). Job enrichment, socio-technical design, and quality circles: Effects on productivity and quality of work life. Unpublished manuscript. Michigan State University.

Rosow, J.M. (1989). *New roles for managers: Employee involvement and the supervisor's job*. Scarsdale, New York: Work In America Institute National Policy Study.

Rousseau, D.M. (1977). Technological differences in job characteristics, employee satisfaction and motivation: A synthesis of job design research and socio-technical systems theory. *Organizational Behavior and Human Performance*, 19, 18-42.

Savage, C.M. (1990). *5th generation management: Integrating enterprises through human networking*. U.S.A.: Digital Press.

Stalk, G. Jr. (1988). Time--the next source of competitive advantage. *Harvard Business Review*, July-August, 41-51.

Stein, B.A., & Kanter, R.M. (1980). Building the parallel organization: Creating mechanisms for permanent quality of work life. *Journal of Applied Behavioral Science*, 16, 371-386.

Sundstrom, E. Meuse, K.P., & Futrell, D. (1990). Work teams: Applications and effectiveness. *American Psychologist*. 45:2, 120-133.

Takuchi, H. & Nonaka, I. (1986). The new new product development game. *Harvard Business Review*, January-February, 137-146.

Thorelli, H.B. (1986). Networks: Between markets and hierarchies. *Strategic Management Journal*, 7, 37-51.

Tichy, N.M. Tushman, M.L. & Fombrun, C. (1979). Social network analysis for organizations. *Academy of Management Review*, 4:4, 507-519.

Wall, T.D., Kemp, N.J., Jackson,P.R. & Clegg, C.W. (1986). Outcomes of autonomous work groups: A long-term field experiment. *Academy of Management Journal*. 29:2, 280-304.

Vancil, R.F. (1987). *Passing the baton: Managing the process of CEO succession*. Boston, Mass: Harvard Business School Press.

Walton, R.E. (1980). Establishing and maintaining high commitment work systems. In (Eds.), J.R. Kimberly, R.H. Miles, and Associates, *The organizational life cycle: Issues in the creation, transformation, and decline of organizations*. San Francisco, Jossey-Bass.

Zuboff, S. (1988). *In the age of the smart machine: The future of work and power*. New York: Basic Books.