

CHAPTER 37

Teams and Team Management and Leadership

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This chapter examines the state of the research and practice on teamwork. We review and present main guidelines for the choice of teams, the effective utilization of teams in organizations, as well as available approaches to assess team outcomes. The impacts of teams on different segments of the organizations and future challenges for research and practice are discussed.

1. INTRODUCTION

Teamwork has been recommended as an organizational design feature for many years, as a way to improve productivity, quality, and employee satisfaction (Lawler and Mohrman 1987). This is especially true in today's organizational environment, with increased global competition and a more demanding workforce (Katzenbach and Smith 1993). The increased attention to teams has become widespread particularly in the context of total quality management (TQM) or quality improvement (QI), which relies heavily on teamwork (Dean and Bowen 1994; Deming 1986).

Teamwork represents one form of work organization that can have large positive and/or negative effects on the different elements of the work system and on human outcomes, such as performance, attitudes, well being, and health. Conceiving work as a social system and advocating the necessity of both technical and social performance optimizations as necessary for organizational effectiveness, the sociotechnical theory provides several arguments and examples supporting teamwork. The germinal study, which gave the essential evidence for the development of the sociotechnical field, was a team experience observed in the English mining industry during the 1950s. In this new form of work organization, a set of relatively autonomous work groups performed a complete collection of tasks interchanging roles and shifts and regulating their affairs with a minimum of supervision. This experience was considered a way of recovering the group cohesion and self-regulation concomitantly with higher level of mechanization (Trist 1981). The group had the power to participate in decisions concerning work arrangements, and these changes resulted in increased cooperation between task groups, personal commitment from the participants, and reduction in absenteeism and the number of accidents.

A GM assembly plant located in Fremont, California was considered until 1982, the year it ended operations, the worst plant in the GM system and in the auto industry as whole. For years, the plant presented dismay levels of quality, low productivity, and prevalent problems of absenteeism and turnover. The plant was reopened two years later under a new joint venture with Toyota. Changes focusing primarily on the relationship between workers and management, the organizational structure, and the widespread use of teamwork transformed the plant in one of the most productive ones of the GM system, with high levels of employee satisfaction and very low levels of absenteeism (Levine, 1995).

Examples like those above illustrate the advantages of using teams to perform a variety of organizational assignments and tasks. Supporters of teamwork have promoted teamwork on many grounds, highlighting its potential for increased productivity, quality, job satisfaction, organizational commitment, and increased acceptance of change, among others. Teamwork is the preferred strategy to increase employee involvement in the workplace. Indeed, terms such as *participatory management*, *employee involvement*, and participation are frequently equated with teamwork. According to Lawler (1986), employee involvement affects five major determinants of organizational effectiveness: motivation, satisfaction, acceptance of change, problem solving, and communication. Lawler states that employee involvement can create a connection between a particular level of performance and the perception of a favorable consequence. Involvement in teams can provide rewards beyond those allocated by the organization, such as money and promotion: it can supply intrinsic rewards, that is, accomplishment, personal growth, and so on. Similarly, Lawler argues that allowing people to participate in the definition of the procedures and methods utilized in their daily activities is an effective way to improve those methods and can motivate employees to produce a better-quality job. Teams also can ease the process of implementation of organizational changes and avoid the “not-invented-here” perception and create commitment with the implementation of change.

It has been argued that in many circumstances the effort of a group of people generates effective solutions that would not be produced by the same individuals working independently. This superior outcome would result not only from the greater pooled knowledge available to the group members, but also from the interaction process among them, from the mutual influence on each other’s thinking. This process has been termed *collective intelligence* (Wechsler 1971) and refers to a mode of cooperative thinking that goes beyond simple collective behavior. Finally, system reliability is also assumed to improve through employee participation since it increases the human knowledge variety and enables the workers to understand their role in making the system more efficient and safer.

While there are a number of positive elements associated with teamwork in general, there are also some potential negative elements. Furthermore, these elements are not constant but rather depend on the type of team as well as the organizational environment in which teams operate. In the next section, we propose a typology of teams, review key characteristics of teams, and address the issue of designing teams.

2. TEAMS: TYPES, CHARACTERISTICS, AND DESIGN

2.1. Types of Teams

Sundstrom et al. (1990, p. 120) have defined work teams as “interdependent collections of individuals who share responsibility for specific outcomes for their organizations.” Teams can vary a great deal in the way they are designed, managed, and implemented. Various forms of teamwork have been proposed and applied, from temporary teams (e.g., ad hoc committees, quality improvement teams, project teams) to permanent teams (e.g., manufacturing crews, maintenance crews). Temporary teams are usually set up when some problem occurs or some change needs to be implemented and/or to better manage the change process. Teams also vary greatly in terms of the amount of autonomy and authority they have. For example, manager-led teams have responsibility only for the execution of work (Medsker and Campion 1997). On the other hand, self-managed teams can have a large amount

of autonomy and decide on issues such as work organization and performance monitoring. Somewhere in between, semiautonomous work groups will experience limited degrees of autonomy and decision making over such issues. Finally, teams vary significantly in terms of the task or the nature of work to be performed. Sundstrom et al. (1990) propose four broad categories of work team applications: (1) advice and involvement, (2) production and service, (3) projects and development, and (4) action and negotiation.

2.2. Characteristics of Teams

Lawler (1986) lists the following characteristics of work teams: membership, work area coverage, training, meetings, supervision, reward systems, decision-making responsibility, installation process, and size. Sundstrom et al. (1990) have proposed that work team effectiveness is dynamically inter-related with organizational context, boundaries and team development. Hackman (1987) has proposed a normative model of group effectiveness. The model identifies three process criteria: effort, knowledge, and the appropriateness of task performance strategies. Increases in these three criteria, given task configurations, should improve the overall effectiveness of the group. According to Hackman (1987), the basic levers to change the process criteria are group design, organizational context, and synergy.

2.3. Team Design

For the design of work groups, three different levels of criteria need to be considered. First, global issues on strategy selection need to be defined—that is, decisions regarding the appropriateness of teamwork for the situation at hand, what type of team would be most adequate, and the amount of authority/autonomy granted to the team need to be made. Second, the specifics of the group design and mechanics need to be decided upon, including matters of size and composition/membership, work area coverage or tasks, and coordination. Finally, in agreement with team members, issues related to the team performance and duration need to be defined. This includes reward systems, duration, and performance/effectiveness assessment, all issues that are determinant in making continuation, change, or termination decisions throughout the life of the team.

Decisions at the strategic level are critical and difficult to make. The adequacy of teamwork for a given situation can be assessed through criteria depicted in Tables 3 and 4 in Medsker and Campion (2000) (Chapter 33 of this Handbook). As proposed by Medsker and Campion, Table 3 summarizes advantages and disadvantages of team design as compared to individual job design. Table 4 in Medsker and Campion proposes a list of systematic questions for which affirmative answers support the use of teamwork for the situation at hand. The choice of the appropriate type of team depends on the application but also on the risks and opportunities offered by the different team configurations, as shown in Table 1. The next decision is on amount of authority/autonomy provided to the group. This decision is difficult to make and depends on other characteristics such as the organizational

TABLE 1 Risks and Opportunities for Work Teams

Teams	Risks	Opportunities
Top management teams	Underbounded; absence of organizational context	Self-designing; influence over key organizational conditions
Task Forces	Team and work both new	Clear purpose and deadline
Professional support groups	Dependency on others for work	Using and honing professional expertise
Performing groups	Skimpy organizational supports	Play that is fueled by competition and/or audiences
Human service teams	Emotional drain; struggle for control	Inherent significance of helping people
Customer service teams	Loss of involvement with parent organization	Bridging between parent organization and its customers
Production teams	Retreat into technology; insulation from end users	Continuity of work; ability to home both the team design and the product

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culture, the nature of the team's tasks, the skills and knowledge of the team members, and the training received and to be received. Such a decision has important implications for management and employee involvement, which will be addressed in Section 6.

Decisions at the tactical level, that is, the specifics of the group design and mechanics are usually easier to make and are negotiated with team members. This includes matters of size and composition/membership, work area coverage or tasks, and coordination mechanisms. For many teams, the optimal size is difficult to determine. In fact, a variety of factors may affect team size. Obviously the primary factor is the size and scope of a required project or set of tasks. However, several other factors can influence team size (it should be noted that all factors are not necessarily applicable to all types of teams). Factors affecting team size include:

- Amount of work to be done
- Amount of time available to do the work
- Amount of work any one person can do in the available time
- Differentiation of tasks to be performed in sequence
- Number of integrated tasks required
- Balancing of tasks assignments
- Cycle time required
- Variety of skills, competences, knowledge bases required
- Need for reserve team members
- Technological capabilities

Finally, at the third level, decisions regarding team performance and duration should be negotiated and made prior to engaging teamwork. Section 5 provides a comprehensive, structured list of variables affecting and/or defining team performance. Such characteristics can be used to develop a system to measure and monitor team performance over time.

As mentioned above, teams are widely used in today's organizational environment, with increased global competition and a more demanding workforce (Katzenbach and Smith 1993). The next section describes two important current applications of teamwork.

3. QUALITY IMPROVEMENT AND PARTICIPATORY ERGONOMICS TEAMS

Teamwork has been the backbone of quality improvement. More recently, teamwork has been used in the context of participatory ergonomics (PE). However, while QI teams primarily focus on activities related to identifying, designing, and implementing improvements in both work processes and products/services, PE teams primarily focus on improvement of working conditions. The following sections review the state of the art for both applications of teamwork.

3.1. Teams in the Context of Quality Improvement

Employee participation, particularly through teamwork, is one of the essential foundations of QI. Different from many other management approaches that present teamwork effectiveness as contingent to several aspects, QI supports the use of teams without any specific provisions (Dean and Bowen 1994).

A variety of quality-related teams can exist within organizations. Kano (1993) categorizes teams into three types: (1) functional teams, which are ongoing voluntary problem-solving groups made up of workers in the same workplace; (2) quality building-in-process teams, in which a set of related jobs are shared, with the goal of building quality into a product during the assembling process; and (3) task/project teams, which are ad hoc groups comprised of staff or line managers, who disband once the task is completed.

Quality circle (QC) is one of the most widely discussed and adopted forms of teamwork (Cotton 1993). QCs are project/problem-solving teams that have been defined as small groups of volunteers from the same work area who meet regularly to identify, analyze, and solve quality-related problems in their area of responsibility (Wayne et al. 1986). These groups usually consist of 8 to 10 employees who meet on a regular basis, such as one hour per week. In many QCs, the supervisor is designated as the circle leader. Formal training in problem-solving techniques is often a part of circle meetings.

The claimed benefits of QCs include quality and cost awareness; reduction in conflict and improved communications; higher morale, motivation, and productivity; and cost savings (Head et al. 1986). The effect of this type of teamwork on employee attitudes is assumed to be the primary reason for their success (Head et al. 1986). Marks et al. (1986) propose that QC participation will lead to enriched jobs, with employees experiencing work as more meaningful, obtaining greater knowledge

of the results of their work, and gaining a greater sense of responsibility. Enriched jobs are the result of increased skill variety, task identity, task significance, autonomy, and feedback (Hackman and Oldham 1980). These job characteristics may then be related to outcomes that include higher job satisfaction and motivation.

Teamwork can enrich jobs through different mechanisms. Skill variety can be increased from both project activity and one's role within the team. Activities such as data collection and analysis, problem solving, presenting information to groups, and group decision making are key elements in quality-related teamwork, which may not be part of workers' daily routines. Team projects can typically be expected to increase the variety of stimuli to which employees are exposed (Rafaeli 1985).

An essential element of quality-related teamwork is providing feedback to participants (Head et al. 1987). Feedback may be provided through data collection conducted by the team. Interaction within the group and with outside groups (e.g., management, customers) is another potential source of feedback. Team activity increases the frequency of communication among coworkers and supervisors, and may include those outside of the team as well (Buch and Raban 1990; Rafaeli 1985; Marks et al. 1986).

At the team level, the worker may experience a degree of control that is higher than one would expect at the individual level. Autonomy is actually expected to increase among quality team members (Head et al. 1987; Rafaeli 1985). Teams may have control over the content and sequence of activities. In addition, team members may be given control over specific tasks within the group, such as data collection and analysis.

However, the data regarding these hypothesized relationships are somewhat inconsistent. Marks et al. (1986) found that QC participation in a manufacturing firm influenced work attitudes that were directly related to QC involvement: participation, decision making, group communication, worthwhile accomplishments, and enhancing the opportunities and skills needed for advancement. There was no improvement found in job challenge, personal responsibility, and overall job satisfaction. Rafaeli (1985), in a study of QCs in a manufacturing firm, did find QC involvement to be related to the job dimension of task variety, but not to autonomy. In addition, Rafaeli found no relationship between QC involvement and job satisfaction. Head et al. (1986) also studied QC participation in a manufacturing setting, and found no significant differences on any of the core job dimensions, nor in satisfaction or motivation measures. While Mohrman and Novelli (1985) did find improvements in job satisfaction for warehouse employees, there were then decreases in satisfaction after one year. Non-participants were significantly lower in feedback and involvement in decision making. Buch and Raban (1990) reported improvements in QC members' perceptions of certain job dimensions, such as autonomy and communication. However, they did not find any difference between members and nonmembers in overall job satisfaction. Finally, Jennings (1988) found QC participation to be related to negative outcomes, namely role conflict and stress.

These conflicting results may be due to the time period in which the different studies were conducted. Longitudinal studies of QCs have shown a consistent pattern of diminishing effects over time. Griffin (1988) found increases in both job satisfaction and organizational commitment for the first one and a half years of a QC program in a manufacturing plant, which were followed by decreases in these measures over a three-year period. Mohrman and Novelli (1985) found a similar pattern of results for job satisfaction. In a qualitative study of manufacturing and banking organizations, Doherty et al. (1989) found an increase, followed by a decrease, in perceived communication, participation, and employee/management relations for a team suggestion program.

The patterns from longitudinal studies indicate that QCs might not have lasting effects. Perhaps long-lasting attitudinal changes should not be expected from a program that accounts for such a small proportion of employees' total work time (Wood et al. 1983). Overall, studies of QCs seem to show a slight impact on satisfaction and commitment. Cotton (1993) argues that direct, teamwork-related attitudes, such as perceptions of influence, are more affected by QCs, while general attitudes, such as job satisfaction and organizational commitment, are less affected.

It has been suggested that, in order to obtain greater benefits, teamwork should be part of a more comprehensive program (Head et al. 1986). Quality circles are a parallel structure in the organization and may not have the authority or resources to affect change (Lawler and Mohrman 1987). QCs may not be related to the day-to-day work done in organizations, and nonparticipants may feel left out, resulting in a negative backlash (Lawler 1986). Demands may be increased for both participants and nonparticipants. For participants, there are the additional duties of going to team meetings and training sessions, while nonparticipants may occasionally have to fill in for participants who are away from their jobs. The main drawback with QCs, according to Lawler and Mohrman (1987), is that they are not well integrated into the organization, in terms of management philosophy, technical and organizational redesign, personnel policies, and training.

Quality improvement (QI) uses quality teams that are similar to QCs in that they address specific problem areas, employ statistical tools, provide group process and problem-solving training to team members, and use team facilitators. Both QCs and QI teams use the PDCA cycle (Plan, Do, Check,

Act) and the QC Story (i.e., seven-step problem-solving method) as their primary problem-solving methodologies. However, there are differences in the context of quality teams under QI that may result in better integration within the organization.

Carr and Littman (1993) identify several differences between QI teams and QCs. QCs are often limited to employees and front-line supervisors, while QI teams include members from management as well. Involving management in quality teams can reduce management resistance and fear. QCs in general have a more limited focus than QI teams in both issues addressed and composition of teams. While QCs generally include only the members of a specific work area, QI teams may be cross-functional, including members from different units within the organization. Teams such as this can deal with broader organizational issues and can implement solutions that are more likely to be accepted and effective since more stakeholders are involved. Teams under QI have the potential for a high degree of integration into the organization through greater involvement of management and the existence of more broadly based teams.

3.2. Participatory Ergonomics

Perhaps one of the fastest-growing applications of teamwork has been in the field of ergonomics. The use of teams to evaluate, design, and implement jobs and workstations is relatively recent but has met widespread acceptance. A clear indication of this trend is the growing number of submissions on the topic in most national and international ergonomics conferences and the inclusion of employee participation as one of the basic requirements in the proposed OSHA Ergonomics Standard (OSHA 1999).

Participatory ergonomics can be understood as a spinoff of the activity of quality-related teams focusing on working conditions. Noro and Imada created the term *participatory ergonomics* (PE) in 1984 with the main assumption that ergonomics is bounded by the degree to which people are involved in conducting this technology. According to Imada (1991), PE requires users (the real beneficiaries of ergonomics) to be directly involved in developing and implementing ergonomics. Wilson (1995) more recently proposed a more comprehensive definition of PE as "the involvement of people in planning and controlling a significant amount of their own work activities, with sufficient knowledge and power to influence both processes and outcomes in order to achieve desirable goals."

Imada (1991) points out three major arguments in support of worker involvement in ergonomics. First, ergonomics being an intuitive science, which in many cases simply organizes the knowledge the workers are already using, it can validate the workers' accumulated experience. Second, people are more likely to support and adopt solutions they feel responsible for. Involving users/workers in the ergonomic process has the potential to transform them into makers and supporters of the process rather than passive recipients. Finally, developing and implementing technology enables the workers to modify and correct occurring problems continuously.

Participatory ergonomics can be an effective tool for disseminating ergonomic information allowing for the utilization of this knowledge in a company-wide basis. It is evident that professional ergonomists will not be available to deal with all the situations existent in an entire organization and that there is a need to motivate, train, and provide resources to workers to analyze and intervene in their work settings.

Participatory ergonomics sees end users' contributions as indispensable elements of its scientific methodology. It stresses the validity of simple tools and workers' experience in problem solution and denies that these characteristics result in nonscientific outcomes. Employees or end users are in most situations in the best position to identify the strengths and weaknesses of the work situations. Their involvement in the analysis and redesign of their workplace can lead to better designs as well as increase their and the company's knowledge on the process.

This approach stresses the relevance of "small wins" (Weick 1984), a series of concrete, complete, implemented contributions that can construct a pattern of progress. The nature of these small victories allows the workers to see the next step, the next improvement, and it constitutes a gradual, involving movement towards organizational change. Participatory ergonomics is seen occasionally either as method to design and implement specific workplace changes or a work organization method in place regardless of the presence of change. Wilson and Haines (1997) argue that the participatory process is in itself more important than the focus of that participation since a "flexible and robust" process may support the implementation of any change.

Participatory ergonomics emphasizes self-control and self-determination and provides workers more control over their working conditions. This approach also offers potential for reduced job strain through increased social interaction and support. In fact, worker involvement has been shown to be the most common feature among effective stress-management programs (Karasek 1992).

Participatory ergonomics has been implemented through a variety of different organizational approaches and team designs, and no clear unifying model has been proposed or seems likely to be achieved (Vink et al. 1992). Liker et al. (1989) describe six different models of participation based on either direct or representative participation and on different levels of worker input. Wilson and

Haines (1997) describe seven dimensions of participatory ergonomics, characterizing the level of participation (e.g., workstation, organization), focus (e.g., product, workstation, job), purpose (e.g., design, implementation), timeline (e.g., continuous, discrete), involvement (e.g., direct, representative), coupling (e.g., direct, remote), and requirement (e.g., voluntary, necessary).

The tools employed in participatory ergonomics clearly reflect the importance given to the simplicity and meaningfulness of the methods. Group processes follow procedures that mirror those used in quality-related teams. The most common techniques utilized are also derived from QI applications, including Pareto analysis, brainstorming, cause-and-effect diagram, flowcharts, and several forms of displaying quantitative information. Other tools for observation, time measurement, workstation analysis, and problem solving have been developed to address the needs of teams working on ergonomic issues. See Noro and Imada (1991) and Wilson and Haines (1997) for a more complete account of available methods.

Participatory ergonomics is a main feature of most successful ergonomic programs, as emphasized in the National Institute for Occupational Safety and Health's (NIOSH) elements of ergonomics programs (Cohen et al. 1997). This approach has been increasingly common among interventions aimed at improving productivity and reducing both physical and mental workloads. Successful applications of PE have been reported in many industries, including meatpacking (Garg and Moore 1997), health care (Evanoff et al. 1999), automotive (Joseph 1986; Orta-Anes 1991; Keyserling and Hankins 1994), office work (Vink et al. 1995; Hains and Carayon 1998), and agriculture (Sutjana et al. 1999).

Even though the potential benefits are significant, PE faces the same difficulties as do other teamwork initiatives discussed elsewhere in this chapter. Difficulties for the successful implementation of PE include lack of commitment from management and its use as decoy for other purposes such as undermining the union or reducing management influence (Day 1998). The skeptical stance of management regarding the need for ergonomic improvement, the lack of worker awareness of ergonomic deficiencies, and labor management conflict are also highlighted as possible hurdles for PE development (Vink et al. 1992).

4. KEY SUCCESS FACTORS FOR EFFECTIVE TEAMS

Teamwork is not a simplistic, mechanistic work organization technique that can be applied easily with immediate results. To the contrary, it can be a complex management approach that demands well-planned support in all its phases to be effective. Teamwork is not a panacea and is not suitable to all organizational contexts.

Some basic insights into the suitability of teams can be derived from Kanter's (1983) thoughts on participatory management. *Mutatis mutandis*, the use of teamwork (participation) is appropriate for situations related to staying ahead of change, gaining new sources of expertise, involving all who know something about the subject, achieving consensus in controversial matters, building commitment, dealing with problems belonging to no one by organizational assignment, balancing vested interests, avoiding hasty decisions, handling conflicting views, and developing and educating people through their participation. On the other hand, teamwork can be inadequate when a solution for the problem is already available, when nobody really cares about the issue, and when there is no time for discussion.

Kanter (1983) suggests that for participation to be effective, the following elements are required: leadership (particularly for the initiation of the process), a clearly designed management structure, assignment of meaningful and feasible tasks with clear boundaries and parameters, a time frame, scheduling of reports and accountability, information and training for participants, recognition and rewards for teams' efforts (extrinsic rewards), delegation of control but no abdication of responsibility, and a clear process of formation of the participatory groups as well as their evolution and ending and the transfer of learning from them.

Management support has been widely recognized as the fundamental condition for the implementation of teamwork initiatives (Carr and Litman 1993; Hyman and Mason 1995; Kocham et al. 1984). Without continued support and commitment from management, team efforts are doomed to failure. The role of top management is to initiate the teamwork process, setting up policy and guidelines, establishing the infrastructure for team functioning, providing resources, promoting participation, guidance, and cooperation, and assigning a meaningful and feasible task. Tang et al. (1991) report a relationship between upper-management attendance and team members' participation and between middle-management attendance and teams' problem-solving activities. In a study of 154 QC applications from 1978 to 1988, Park and Golembiewski (1991) found middle-management attitude to be the strongest predictor of team success. Employees who are involved in team projects that receive low levels of management support may become frustrated due to lack of resources and cooperation. This may in turn result in negative attitudes, not only towards the project itself, but also towards the job and organization.

Hackman (1990) points out that unclear or insufficient authority or mandate, which relate to the lack of support from top management, are critical impediments to team achievement. Hackman indicates some consequential issues for teams with regard to group authority. First, the team needs to have authority to manage its own affairs. Second, teams need a stable authority structure. Finally, the timing and substance of interventions by authoritative figures. Interventions by authoritative figures can be most effective as the beginning of team development and can be particularly harmful if done on concerns that the group sees as theirs.

For ad hoc teams in particular, the clarity and importance of the team charge also play an important role in the definition and achievement of success. The team charge should be specific and relevant from the participants' and organization's perspectives.

Time limits are powerful organizing factors that shape team performance, particularly for ad hoc teams (Gersick and Davis-Sacks 1990). The available time guides the pace of work and the selection of strategies employed by teams. The lack of clear timelines can cause problems for teams making adopted strategies inadequate and impacting negatively the members' motivation. Time landmarks can in some situations be provided to the team through other avenues, such as a training delivery schedule (Taveira 1996).

The careful definition of team composition is emphasized as an essential aspect of team success in the literature (Carr and Littman 1993; Larson and LaFasto 1989; Scholtes 1988; Kanter 1983). These authors indicate that the absence of members with key expertise or critical organizational linkages can be a sticking point for teams. Both technical and organizational aspects need to be observed in team composition.

The team leader role is essential as an external linkage between the group and upper management, as a promoter of involvement, and as a coordinator and facilitator of communication inside the group (Taveira 1996; Scholtes 1988). Another facet of the team leader's position, serving as a role model, is highlighted by Bolman and Deal's (1992) symbolic tenet: "example rather than command holds a team together." The diligence of the leader in his effort of coordinating and supporting the team can motivate members to volunteer for work assignments and ease the distribution of assignments.

Training is considered to be the one of the most essential resource for team success. It can provide fundamental principles and procedures for its functioning. Training can impart ground rules, guidelines for internal and external communication, and favored ways to make decisions. Training sessions can provide opportunities to discuss and learn with other teams and be conducive to a perception of support and predictability about oncoming tasks and group development. It can introduce the team to a number of procedures and behaviors that enhance communication and involvement (Taveira 1996). Training in problem solving, data collection and analysis, and group decision making is necessary for employees to fully contribute to the group process.

Training is seen as fundamental for giving the team structure for a sound internal process (Hackman 1990). In the specific case of "one-project" teams, where a nonroutine task is undertaken by a new mix of people, training may be critical. Since such groups are unlikely to have established routines for coordinating members' efforts or for determining how work and influence will be distributed among them, training may provide vital guidelines (Gersick and Davis-Sacks 1990).

Moreland and Levine (1992) define commitment as an emotional bond between a person and a group. These authors point out two prevalent theories on commitment: (1) people are committed to a group insofar as it generates more rewards and fewer costs than do other groups to which they already belong or that they could join; (2) commitment depends primarily on how important a group is to someone's social identity. This second theory implies that a need for self-enhancement leads people to feel more committed to groups that seem more successful. A logical extension could be that early success increases the member's commitment to the group.

Correspondingly, Hackman (1990) asserts that groups that begin well and achieve some early wins often trigger a self-sustained upward trend in performance. Hackman delineates a two-factor hypothesis in this regard. The first factor is the quality of the group's initial design, and the second is the occurrence of positive or negative events that trigger the spiral.

Consensus is frequently referred to as the preferred decision-making strategy for teams. Shared definitions of consensus and clear procedures to put this mode of decision making in place are needed. Consensus is defined by Scholtes (1988) as a process of finding a proposal that is acceptable enough that all members can support it and no member opposes to it. Consensus requires time and active participation from team members (Carr and Littman 1993). It demands mutual respect (listening), open-mindedness, and effort at conflict resolution.

Amason et al. (1995) characterize the management of conflicts as "the crux of team effectiveness." They assert that effective teams manage conflict in a way that contributes to its objective. Less-effective teams either avoid conflict, which leads to compromised decisions, or let it seriously disrupt the group process. The authors divide conflict into two types of cognitive and affective. Cognitive conflict focuses on the substance of the issues under discussion. Examination, comparison, and conciliation of opinions characterize it. Cognitive conflict is useful because it invites team members to consider their perspectives from different angles and question underlying assumptions. It can improve members' understanding and commitment to the team's objectives. Affective conflict focuses on

disagreements on personal matters and contributes to distrust, bitterness, cynicism, and indifference among team members. Amason et al. believe that task orientation, an inclusive strategy, and open communications are the key elements in fostering cognitive conflict, while avoiding affective conflict.

Nemeth (1992), analyzing the role of dissent on groups, highlights the importance of a vocal minority. According to Nemeth, the expression of disagreeing views, even when they are wrong, encourages attention and thought processes that enable the identification of new facts and solutions and promotes the quality of group decision making and performance. Disagreement may preclude precipitated action (Kanter 1983) and the occurrence of “groupthink” (Janis 1982), in which alternative courses of action are not considered. Minority views stimulate divergent thought processes, adoption of multiple perspectives, and the use of multiple strategies for problem solution.

Gersick and Davis-Sacks (1990) postulate that the challenge of the group is to find the correct equilibrium of independence from and sensitivity to outsiders. The authors add that balancing the relationship between the team and the outside context becomes more complicated when outsiders have dissimilar expectations. The team’s composition also influences this balancing since it represents a specific aggregate of dispositions toward, and information about, those stakeholders.

References can be found in the literature to the idea that styles of participatory management should match the organizational culture. Locke et al. (1986) state that the “manager’s natural style of leadership” (including decision making, autonomy, and employee control) must also be considered. Similarly, the goals of participatory management should be matched with employee knowledge, skills, and ability. Assessment of the organization’s characteristics and needs concerning the implementation of participatory management is fundamental. Particularly, a careful training plan must be developed aimed at motivating and preparing people for teamwork.

Additionally, that an organization that has historically promoted from within and has good employee relations may benefit from more from teamwork than an organization that has high employee turnover rates and does not invest in long-term development of human resources.

There may be other drawbacks to participation in teams. Divided loyalties between the group and the organizational segments to which the members belong may result in peer pressure against participation. Coercion and retaliation against team members by management is a possibility. Members may also be frustrated if team recommendations are not acted upon or if their efforts are not recognized by top management.

Duffy and Salvendy (1997, 1999) using a survey of 103 electronic component manufacturers using concurrent engineering, reached conclusions extremely consistent with the experience of groups working in other organizational contexts. Their findings confirmed the importance of team members’ proximity for success in product development and concurrent engineering efforts. Physical proximity increases communication frequency, and teams are likely to be more successful if they communicate more frequently. Successful group work was found to be dependent on a reward structure that reflects group achievement as well as individual achievement. Team size, problem-solving effectiveness, and technical training were also found to contribute to success. The perceived value of communication between different concurrent engineering functions/roles was found to be significantly related to quality of communication and concurrent engineering success.

The implementation of teamwork demands organizational resources, not only in financial terms, but also in time and organizational effort required for planning, training, meetings, and other activities. Therefore, resources must be allocated, and contrary to what some believe, effective teamwork is not free, and spontaneity is not the only driving force behind it.

5. TEAM EFFECTIVENESS

Team performance can be approached in many ways. The following model (developed specifically for QI teams) adopts a systems perspective to conceptualizing team performance by classifying the various factors affecting or related to performance into three broad categories derived from the structure–process–outcome paradigm espoused by Donabedian (1992). The model is displayed in Figure 1 and discussed in detail below. While it was developed in the context of quality improvement, many or all of its elements apply to other teams as well.

5.1. Structure Variables

Structure variables are the contextual parameters that may impact team processes and outcomes. We identified the following three dimensions within which the different structure variables could be classified: organizational characteristics, team characteristics, and task characteristics.

5.1.1. Organizational Characteristics

Researchers have discussed the impact of several organizational variables on project outcomes. Three factors stand out: top-management support, middle-management support, and sufficiency of resources.

- *Top-management support* of project teams has been stressed in terms of the extent to which the management encourages the team, provides constructive feedback, actively champions the pro-

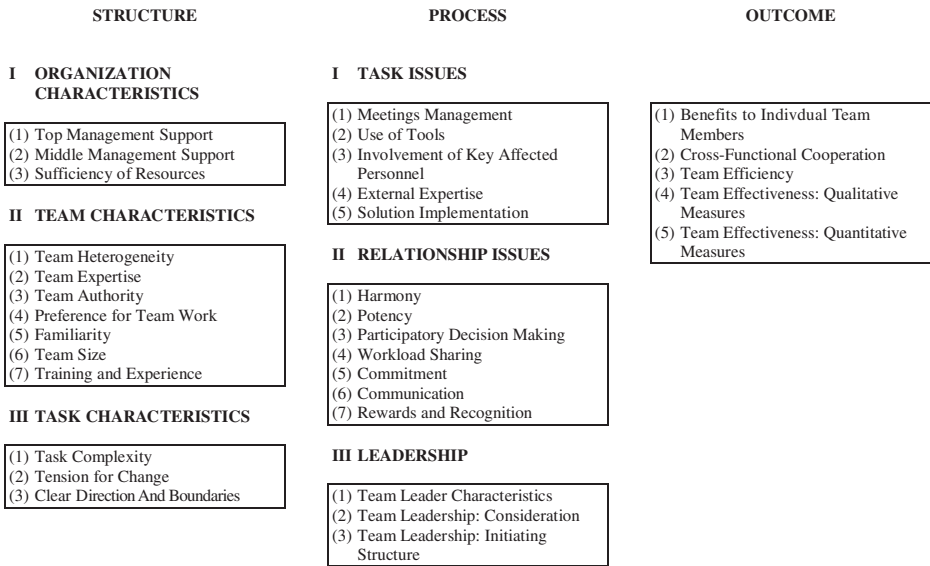


Figure 1 Model of Team Effectiveness.

ject, regularly reviews the team’s progress, and rewards the team for its performance (Waguespack 1994; Mosel and Shamp 1993; McGrath 1964; Smith and Hukill 1994; Van de Ven 1980; CHSRA 1995; Rollins 1994).

- *Middle-management support* is deemed important for successful QI team performance because team members need to be given time off by their supervisors from their routine jobs to work on team issues (Gladstein 1984; Davis 1993). Team members have often reported difficulty in obtaining permission from their supervisors to attend team meetings (CHSRA 1995). Indeed, lack of encouragement and recognition and inadequate freedom provided by supervisors has been shown to contribute to delays in successful completion of projects (Early and Godfrey 1995).
- *Sufficiency of resources*, although an aspect of top-management support, has been so consistently linked with project outcome that it warrants separate discussion. Availability of adequate training, access to data resources, ongoing consulting on issues related to data collection, analysis, and presentation, adequate allocation of finances, and availability of administrative support are some of the resources cited as important in studies on team effectiveness (Mosel and Shamp 1993; Levin 1992; Smith and Hukill 1994; Early and Godfrey 1995; Gustafson et al. 1992; Nieva et al. 1978; CHSRA 1995).

5.1.2. Team Characteristics

Team characteristics, or group composition, has received significant attention in studies on team effectiveness. We identified the following seven distinct aspects of team composition that are likely to impact QI team performance: team heterogeneity, team expertise, team authority, preference for teamwork, familiarity, team size, and quality-improvement training and expertise.

- *Team heterogeneity* refers to the mix of personalities, attitudes, skills, background, abilities, rank, and experience among team members. Several studies have discussed the significant impact of team heterogeneity on team effectiveness (Guzzo and Dickson 1996; Campion et al. 1993; Morgan and Lassiter 1992; Salas et al. 1992).
- *Team expertise* assesses the team’s ability to solve the assigned problem. A QI team would possess the expertise required to complete a project successfully if it included members who had expert knowledge of the functional area under study as well as adequate training and experience in the methods of quality improvement. In particular, studies show that successful teams have adequate representation of all departments affected by the process under study,

especially the process owners who have intimate knowledge of the process. In addition, successful teams also include members with prior QI teamwork experience (Rollins et al. 1994; Flowers et al. 1992; Johnson and Nash 1993; CHSRA 1995).

- *Team authority* assesses the relative power of the team within the organization that would facilitate the completion of the project efficiently and successfully. For instance, Gustafson et al. (1992) suggest that the reputation of the team leader and other team members among the affected parties significantly impacts the implementation success of solutions. Involvement of people in a position of authority on the team, such as department heads, and inclusion of opinion leaders, i.e., people whose opinions are well respected by the affected parties, helps in overcoming resistance to change and eases the process of solution implementation (CHSRA 1995; Davis 1993; Nieva et al. 1978; Rollins et al. 1994).
- *Preference for teamwork* is another important element of team composition. Campion et al. (1993) cite research that shows that employees who prefer to work in teams are likely to be more satisfied and effective as members of a team.
- *Familiarity* among team members may lead to improved group dynamics and hence better team effectiveness. Team members who are more familiar with each other may be more likely to work together better and exhibit higher levels of team performance (Misterek 1995).
- *Team size* has been found to have an important effect on team performance (Morgan and Lassiter 1992). Although larger teams result in increased resources, which may lead to improved team effectiveness, they may also lead to difficulties in coordination and reduced involvement of team members (Campion et al. 1993; Morgan and Lassiter 1992). Campion et al. (1993) suggest that teams should be staffed to the smallest number needed to carry out the project.
- *Quality-improvement training and experience* of team members has also been shown to affect the outcome of QI projects significantly. Although it features as an aspect of overall team expertise, we consider it important enough in the context of QI project teams to discuss separately. Case studies of successful QI teams show that most of the members of the teams had either participated on other QI projects or at least received some form of prior QI training, such as familiarity with the common QI tools and group processes (CHSRA 1995).

5.1.3. Task Characteristics

Task characteristics are factors that are specific to the problem assigned to the project team. We classify the various task characteristics deemed important in previous research studies into three categories:

1. *Task complexity* has been studied at two levels: (a) as a measure of the complexity of the process being studied, e.g., number of departments affected by the process (CHSRA 1995; Misterek 1995), the difficulty of measuring the process quantitatively (Davis 1993; Juran 1994); and (b) as a measure of the complexity of the goals assigned to the team, e.g., scope of the project, number of goals to be accomplished (Juran 1994).
2. *Tension for change* assesses the importance, severity, and significance of the project. Greater tension for change leads to higher motivation for solving the problem (Juran 1994; Gustafson et al. 1992; Van de Ven 1980). In order to be successful, projects should (a) be selected based on data-driven evidence of the existence of the problem (Mosel and Shamp 1993; Rollins et al. 1994; CHSRA 1995); (b) focus on processes that are a cause of dissatisfaction among the process owners (Gustafson et al. 1992); and (c) be considered important areas for improvement by management (Mosel and Shamp 1993).
3. *Clear directions and boundaries* refer to the extent to which management provides the team with a clear mandate. The clarity with which management describes the problem, its requirements, and project goals and explains the available team resources and constraints has been discussed as directly affecting team processes and outcomes (Misterek 1995; Levin 1992; Gustafson et al. 1992; Fleishman and Zaccaro 1992).

5.2. Process Variables

Mosel and Shamp (1993) and Levin (1992) classify process variables into two core dimensions: (1) task or project dimension, which consists of processes that are directly related to solving the assigned problem, such as use of QI tools, efficient planning of meetings, and solution generation and implementation, and (2) relationship or socioemotional dimension, which deals with the dynamics and relationships among team members, such as communication and harmony. Since team leadership impacts both task and relationship issues, we consider it separately as a third dimension of process variables. We discuss these three dimensions of process variables next.

5.2.1. Task Issues

The following five task variables have been shown to impact team outcomes and other team processes:

1. Efficient *meetings management* has been shown to result in sustained member involvement and improved overall efficiency with which the team solves the problem (CHSRA 1995). In particular, the advantages of mutually establishing team norms up front (such as meeting times, frequency, and length), and advanced planning of meeting agenda and assignment of responsibility to members for specific agenda items have been highlighted (Davis 1993; Juran 1994).
2. *Quality-improvement tools* aid the team at various stages of the project. Effective use of tools has been shown to help teams keep track of their activities, clarify understanding of the system, help identify problems and solution, help maintain focus, and aid in decision making and data collection and analyses (Plsek 1995; Scholtes 1988; CHSRA 1995; Levin 1992).
3. *Involvement of key personnel*, especially those who are directly affected by the process being studied, significantly improves the chances of success of a QI project (Gustafson et al. 1992). For instance, involvement of process owners during the various stages of problem exploration, solution design, and implementation results in a better understanding of the problem by the team and leads to solutions that are more likely to be accepted and implemented smoothly (Rollins et al. 1994; CHSRA 1995; Van de Ven 1980).
4. *External expertise* refers to sources outside the organization that may be helpful to the team during the various stages of the project. For instance, comparison of current levels of performance with industry standards often helps in providing data-based evidence of the severity of the problem, thereby resulting in increased management support (CHSRA 1995). Networking with other organizations that have successfully solved similar problems and identifying benchmarks helps teams develop successful solutions (Gustafson et al. 1992). Examples of other sources of external expertise that can help teams better understand the problem, and design effective solutions include literature, consultants, and clearinghouses (Rollins et al. 1994; CHSRA 1995).
5. Poor *solution implementation* not only may lead to significant delays in completion of a project (Early and Godfrey 1995) but may also result in the failure of the team's solutions in resulting in any substantial improvement (Gustafson et al. 1992). In order to implement its solutions successfully, the team needs to get buy-in from the process owners (Juran 1994; Rollins et al. 1994; Gustafson et al. 1992; Johnson and Nash 1993; CHSRA 1995). In order to evaluate and demonstrate the advantages of their solutions, the team needs to develop easy to measure process and outcome variables and must have in place a well-designed data-collection strategy (Juran 1994; CHSRA 1995). In addition, feedback from the process owners should be obtained to facilitate further improvement of the process (Gustafson et al. 1992).

5.2.2. Relationship Issues

The relationship-based variables that have been shown to impact a team's performance are as follows:

- Team *harmony* refers to the ability of team members to manage conflict and work together as a cohesive unit. The extent to which team members cooperate with one and other and work well together has been shown to affect team outcomes positively (Misterek 1995; Guzzo and Dickson 1996; Mosel and Shamp 1993).
- Team *potency* has been defined as a team's collective belief that it can be effective (Guzzo and Dickson 1996). It is similar to Bandura's (1982) notion of self-efficacy. Campion et al. (1993) have demonstrated a positive relationship between team potency and outcomes such as team productivity, effectiveness, and team member satisfaction.
- *Participatory decision making (PDM)* refers to involvement of all team members on important team decisions. Participation in decisions results in an increase in members' sense of responsibility and involvement in the team's task (Campion et al. 1993). PDM style has been shown to be a common characteristic of successful QI teams (CHSRA 1995; Scholtes 1988).
- *Workload sharing*, similar to PDM, ascertains the extent of balanced participation among members of a team. Teams where most of the members contribute equally to the work have been shown to be more productive and successful (CHSRA 1995; Campion et al. 1993; Scholtes 1988).
- *Commitment* of team members to the team's goals is one of the driving forces behind effective teams (Waguespack 1994). Successful QI teams have reported member motivation and commitment to improve the process as being a critical factor in their success (CHSRA 1995).
- *Communication* is a critical component of teamwork because it serves as the linking mechanism among the various processes of team functioning (Rosenstein 1994). For instance, Davis (1993)

discusses the impact of open communications among members of a QI team on team member commitment. Studies have also demonstrated a positive association between open communication and team performance and team member satisfaction (Gladstein 1984; Campion et al. 1993).

- *Rewards and recognition* help motivate team members and enhance their commitment to team goals (CHSRA 1995). Levin (1992) suggests that formally celebrating the achievement of various project milestones helps a QI team maintain its momentum, motivation, and enthusiasm for accomplishing the project successfully.

5.2.3. Leadership

The impact of team leadership on team performance has been extensively researched. The role of a team leader is to provide direction, structure, and support to other team members (Dickinson et al. 1992). The behavior and competence of the team leader has been shown to affect significantly both team processes and outcomes (CHSRA 1995; Mosel and Shamp 1993). Rosenstein (1994) divides leadership into two distinct but correlated behaviors:

1. *Consideration*, which focuses more on the relationship-based team processes, e.g., the extent to which the team leader facilitates open communication among team members
2. *Initiating structure*, which focuses more on the task-oriented team processes, e.g., the ability of the team leader to plan and coordinate the team's activities capably.
3. In addition to these two behavioral factors, researchers have also emphasized the team leader's *overall characteristics*, such as skills and commitment (Smith and Hukill 1994; Juran 1994). We therefore evaluate the dimension of leadership on all three factors.

5.3. Outcome Variables

Outcome variables constitute the results of the team's performance. We identified four different outcome variables that have been the focus of existing research studies on team performance: benefits to individual team members, cross-functional cooperation, team efficiency, and team effectiveness.

1. *Benefits to individual team members* assesses the influence of the team experience on individual team members (Hackman 1987). Increased job satisfaction, a feeling of accomplishment, and a more problem-focused approach to the daily work are some of the benefits that members derive as a result of participating on teams (Juran 1994; Campion et al. 1993).
2. Improvement in *cross-functional cooperation* is a very common positive outcome of successful QI team efforts (CHSRA 1995). Studies have shown that participation in QI teams by members of different departments often results in the development of mutual trust and respect across departments and a greater understanding of the system, which leads to improved interdepartmental cooperation and communication (Rollins et al. 1994; Juran 1994).
3. The output of the team's effort is measured both in terms of efficiency and effectiveness. *Team efficiency* assumes importance because organizations implementing TQM often complain about the time required to experience significant improvement (Early and Godfrey 1995). In a study of causes of delays in completing QI projects, Early and Godfrey (1995) report that up to 62.8% of the total time taken by the teams could have been avoided. Team productivity has also been a key outcome measure in studies of various other work groups (e.g., Campion et al. 1993).
4. *Team effectiveness* can be assessed by both qualitative and quantitative measures (Landy and Farr 1983; Guzzo and Dickson 1996). Qualitative measures are more subjective and judgmental, such as ratings that require individuals to evaluate the performance of the team (e.g., Campion et al. 1993). Quantitative measures, on the other hand, are objective and nonjudgmental, such as reduction in length of stay, dollars saved, and reduction in error rate (e.g., CHSRA 1995).

6. IMPACT OF TEAMS

Teamwork represents one form of work organization that can have large positive and/or negative effects on the different elements of the work system and on human outcomes, such as performance, attitudes, well being, and health. Given the variety of team characteristics and organizational settings, it is likely that the impact of teamwork on the work system will be highly variable. Some teams may provide for positive characteristics, such as increased autonomy and more interesting tasks, whereas other teams may produce production pressures and tightened management control (Lawler 1986). One important issue in team design is the degree of authority and autonomy (Medsker and Campion 1997; Goodman et al. 1988). It is, therefore, important to examine the impact of teamwork on the task and organizational elements of the work system. Tasks performed by teams are typically of

different nature of tasks performed by individual employees. Understanding the physical and psychosocial characteristics of the tasks performed by the team and the members of the team is highly significant for ergonomists. Teams can provide opportunities for reducing the physical and psychosocial repetitiveness of tasks performed by individual employees. This is true only if employees have sufficient training on the different tasks and if rotation among tasks occurs. In some instances, the increased authority and autonomy provided to teams may allow employees to influence their work rhythms and production schedules. This may have beneficial physical impact if adequate work-rest schedules are used. On the other hand, members of the team may work very hard at the beginning of the shift in order to rest at the end of the day. This overload at the beginning of the shift may have some physical health consequences, such as cumulative trauma disorders. A more balanced workload over the entire shift is preferred. In other instances, teamwork has been accompanied by tightened management control (Barker 1993) and electronic and peer surveillance (Sewell 1998). In conclusion, the impact of teamwork on work organization and ergonomics is largely undetermined and depends on a range of factors. However, teamwork can provide many opportunities to improve elements of the work system.

6.1. Impact on Management

The upper managerial levels of organizations have been traditionally targeted in the efforts to sell teamwork. For these management segments, the benefits would come in improvements to the whole organization success and the possibility of spending more time working at the strategic level once the daily decisions can be undertaken by the employee teams. However, one group whose needs are frequently overlooked when implementing employee involvement programs is the middle managers or supervisors. Because the supervisors are a part of management, it is often assumed that they will buy into the philosophies adopted by upper management. Otherwise, according to studies by Klein (1984), even though 72% of supervisors view participation programs as being good for the company and 60% see them as good for employees, less than 31% view them as beneficial to themselves. This perspective is clearly portrayed by Kanter (1983): "participation is something the top orders the middle to do for the bottom." Concerns among supervisors relate to job security, job definition, and additional work created to implement these programs (Klein 1984). A common fear is that employee participation would take supervisors out of the chain of command. Supervisors typically have attained their positions via promotions intended to reward them for outstanding performance as a worker. Sharing their supervisory tasks can be seen as a loss of status to less-deserving workers. Support from first-line supervisors is essential for success of overall participation programs. Some successful experiences in obtaining this support have included the introduction of presentations to upper management, by supervisors, about teamwork activities and creation of teams for forepersons themselves (Harrison 1992).

6.2. Impact on Employees

It is considered that today's better trained and educated workers have expectations greater than basic pay, benefits, and a safe place to work. According to Lawler (1986), these enlarged expectations include participating in meaningful decisions. On the other side, potential problems from the employee perspective need to be addressed. The literature on the subject of employee involvement has dedicated much less emphasis on the problems than on the benefits. Indeed, when these problems are discussed, they are almost always seen from the perspective of the organization and its management. Very little has been written about the problems from the workers' standpoint.

Regarding the negative consequences of teamwork experienced by workers, Baloff and Doherty (1988) state that it can be very disruptive, especially during the crucial start-up period of employee involvement. These authors classify the negative consequences into three categories. First, participants may be subjected to peer-group pressure against what is perceived as collaboration with management in ways that endanger employees' interests. Second, the participants' manager may attempt to coerce them during the group activity, or they may retaliate against the participants if the results of their involvement displease them. Third, participants may have difficulty adapting psychologically at the end of a highly motivating participation effort if they are thrust back into narrow, rigidly defined tasks. Lawler (1986) expresses similar concern about some types of participation that do not match the overall structure of organization and inevitably will produce frustrated expectations among the workers.

On the more negative side of the spectrum of the assessments on teams, Parker and Slaughter (1994, 1988) see them as a way of undermining the union and exploiting workers. Team concept is seen as part of "management by stress," whereby production is speeded up and management actually exerts *more* control on employees. According to these authors the "work rationalization" that used to be done by management is being made now by the employees themselves. The authors point out that peer pressure related to this kind of involvement is even more restrictive than the hierarchy itself. They state that there are several myths about teamwork, that the team concept involves: job security, increased productivity, more control by workers, working smarter not harder, workers with more

skills, stronger unions, and feeling of teamwork in the shop floor. The authors conclude that teams themselves are not harmful, but rather the way management has put them into practice and the underlying motivations.

All in all, however, if teamwork is properly chosen as a form of work design and if teams are well designed and managed, teamwork can effectively improve productivity, quality, and employee satisfaction.

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