

VIRTUAL TEAMS: THE RELATIONSHIP BETWEEN ORGANIZATIONAL
SUPPORT SYSTEMS AND EFFECTIVENESS

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This study investigates the effects of eight organizational support systems on virtual team effectiveness in five areas: communication, planning tasks and setting goals, solving problems and making decisions, resolving conflict, and responding to customer requirements. One hundred and eighty surveys were sent to information technology managers and collaborative team members, representing 43 companies. The results indicated that developing new roles for IT professionals and senior managers significantly increased virtual team effectiveness in several areas. The findings support the theory that organizations that utilize virtual teams must create high-level structures, policies, and systems to support the teams and the information tools they use.

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The earlier research resulted in a publication titled, “Virtual Teams and Collaborative Technology Benchmarking Study”, published by the University of North Texas’ Center for the Study of Work Teams in 2000, and was co-authored by the individuals listed above, and myself. Consequently, some of the information contained in the following literature review will also be found in the above publication, as well as in Ms. Lee’s thesis on the relationship between training and virtual team effectiveness.

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CHAPTER 1

INTRODUCTION: VIRTUAL TEAMS AND TECHNOLOGY

In order to boost productivity, many organizations have developed some form of collaborative work system. One type of collaborative work system is a team. Work teams within organizations regularly outperform individuals acting alone, especially when performance requires multiple skills, multiple judgments, and multiple experiences (Katzenbach & Smith, 1993). With increasing global competition and advances in computer and telecommunications technologies, organizations have recently begun re-evaluating their structures and work processes. For many team-based organizations, their ability to remain competitive in a fast moving global economy will depend on how well and how quickly their teams can adapt to the constantly changing business environment. These changes often require teams to learn new methods of working and communicating with each other. This evolution can be seen in organizations today, as team members become dispersed, as organizational boundaries become less clear, and as productivity and performance hinges on the ability to obtain information and apply knowledge more effectively (Lipnack & Stamps, 1997).

A group of rapidly advancing telecommunication and computing technologies, including desktop videoconferencing, collaborative software, and internet/intranet systems, is forming the foundation of a new way of working. The “virtual” workplace, unrestrained by geography, time and organizational boundaries, is creating the potential

for new levels of employee flexibility, productivity, and collaboration (Townsend, DeMarie, & Hendrickson, 1998).

In this new virtual workplace these new work teams are commonly referred to as "virtual teams" (Lipnack & Stamps, 1997). Virtual teams are small groups of people working across boundaries, supported by new computer and communications technologies. Virtual teams conduct the majority of their interactions through a combination of collaborative technologies, such as groupware, instead of face-to-face meetings (Lipnack & Stamps, 1997).

Traditional, or co-located, teams generally are made up of relatively permanent team members with a designated team leader or manager. Virtual teams, in contrast, usually have shifting memberships that depend more on the work that needs to be done or the specific skills of the team members, rather than where the team members are located (Kimball, 1997).

Today, people in virtual teams frequently work across internal boundaries, such as specialized functions and divisions within their organizations, and they often work across external boundaries as well. For example, organizations form partnerships across corporate lines with vendors and customers, they form alliances with complementary enterprises, and even associate with direct competitors (Lipnack & Stamps, 1997).

Organizations are investing large amounts of time, money, and effort with the expectation that the impact of their virtual teams on the bottom line will justify their costs. Many organizations are disappointed in the results, however, and few are getting the returns they expected (Mankin, Cohen, & Bikson, 1996).

Most academic studies have focused on the technology needed to support virtual teams. However, the success of virtual teams requires more than merely good collaborative tools. Additional factors, such as management style, individual and task characteristics, and group dynamics, help ensure the successful implementation and management of virtual teams just as they do for face-to-face teams (Horvath & Duarte, 1997). The nature of the organization, including its systems and policies must also change to support virtual teams (Mankin et al., 1996).

Organizational support systems are part of the infrastructure that facilitates organizational processes. These systems must support the conduct of work in the organization and must fit with the way the organization is designed (Mohrman, Cohen & Mohrman, 1995; Sundstrom & Associates, 1999). As an organization's design changes and as work is conducted in new ways, the support systems must change to fit the new logic (Mankin et al., 1996).

Although a virtual team relies on technology to get its work done, it is still, first and foremost a team, and effective teamwork requires a supporting organizational infrastructure (Mohrman et al., 1995; Sundstrom & Associates, 1999). Therefore, to put this study of virtual team effectiveness and organizational support systems in the proper context, it is necessary to review not only the current literature on virtual teams, but also the literature on traditional work teams and the systems needed to support them.

CHAPTER 2

LITERATURE SURVEY

In order to gain the benefits that come from teamwork, it is important for managers and team members to understand how teams differ from regular working groups (see Table 1). A working group usually has a common superior, has some face-to-face interaction, and has some degree of interdependence in carrying out tasks (French, 1995). Working groups also rely on the sum of individuals for their performance, and their collective work products are the result of individual efforts, not a joint effort (Katzenbach & Smith, 1993).

A team, on the other hand, is a form of a working group, but a team has a higher degree of interdependence and interaction, as well as a higher commitment to common goals. These common goals are what motivate team members to commit to the collective action that is necessary to build a common purpose, a common set of goals, and a commonly agreed upon approach. Unlike a working group, a team strives for a collective work product that is greater than what its members could achieve individually (Katzenbach & Smith, 1993).

Katzenbach and Smith (1993) define teams as groups of people who come together to develop a shared purpose, define a shared way of working, agree on performance goals, hold themselves accountable for results, and develop complementary skills (see Table 1).

Table 1

Comparison of Work Groups and Teams

Work Groups	Teams
Strong, clearly focused leader	Individual accountability
Individual and mutual accountability	Shared leadership roles
The group's purpose is the same as the broader organizational mission	Specific team purpose that the team delivers
Individual work-products	Collective work-products
Runs efficient meetings	Encourages open-ended discussion and active problem-solving meetings
Measures effectiveness indirectly (e.g., financial performance of the business)	Measures performance directly by assessing collective work-products.
Discusses, decides, and delegates	Discusses, decides, and does real work together

Note. Adapted from Katzenbach and Smith, 1993.

Types of Teams

There are many types of work teams, which are usually categorized by the work they do or by their purpose (Sundstrom & Associates, 1999; Mohrman & Mohrman, 1997). Examples of different types of work teams include production teams, management teams, and improvement teams. Although certain types of teams more naturally lend themselves to working across boundaries (e.g. sales and service teams) any type of team can be virtual, if it consists of individuals who collaborate to achieve a common purpose and if they successfully use technology to work across time and distance.

Virtual teams can undertake almost any kind of assignment if the team leaders and members understand and address the special challenges that face them. Shell Technology Ventures, a subsidiary of the oil giant Royal Dutch/Shell, uses virtual teams to evaluate new business opportunities. With over half of the team members located seven time zones away in Houston, one of Shell's virtual teams was able to successfully set up a new office in the Netherlands. Because team members only had a three hour window each day during which to interact in real time, they relied heavily on e-mail and after-hour phone calls (Kiser, 1999).

What virtual teams have in common with all teams is that members must communicate and collaborate to get work done. Virtual teams, however, must accomplish this by using technology (Duarte & Snyder, 1999).

Collaborative Technologies

Because technology defines the operational environment of the virtual team, it is important to review some of the more common applications that form the infrastructure of virtual teamwork. Groupware, defined as computer-mediated collaboration that increases the productivity or functionality of person-to-person processes, first appeared in 1978 (Coleman, 1997) but Johansen's 17 Information Technology (IT) Support Mechanisms (1987) set the foundation for using technology to facilitate groups and work teams. Recent technological advances, however, have allowed new support mechanisms for collaborative work groups to emerge. The following tools (see Table 2) represent some of the most prevalent forms of collaborative technology in use today (Johansen, 1988; Coleman, 1997).

Table 2

Collaborative Tools

Tool	Application
Audio Conferencing	Holding meetings usually by means of a standard telephone line with parties able to call in from different locations at the same time. An example would be a typical telephone conference call.
Collaborative Presentation	Computer programs that permit many people to view a single presentation at the same time.
Conference Room Video-conferencing	Holding meetings in a conference room and using a telephone system along with live video to add a visual component.
Desktop Videoconferencing	Provides two-way audio/video conferencing using a PC-based system with near-broadcast quality. Allows point-to-point, spontaneous communication.
Discussion Database	Databases that allow the capture and storage of an electronic discussion.
Document Management	Electronic document capture and delivery, including the capability to view, print, copy, mark-up, and edit documents electronically.
Electronic Whiteboarding	Allows two or more people to view and draw on a shared

	drawing surface, in the same room or in geographically separated locations. Messages written on the board's surface are automatically transcribed electronically.
Electronic Mail	Computer application that allows end-users to create, send, and receive messages. File transfers are also possible.
Group Authoring	Software that allows several individuals to collaborate and share the responsibility of writing and editing a document or report.
Group Decision Support System (GDSS)	Interactive computer-based system designed to support the decision process, especially in meetings. These systems typically support aspects of the decision process such as brainstorming, idea organization, evaluation, prioritization, and voting.
Group Scheduling and Calendaring	Software that supports personnel and facilities event scheduling. Also, meeting management support, including meeting facilitation, and support for virtual, remote, or distributed meetings.
One-Way Bulletin Boards	System that allows posting of information for other individuals to access.
Personal Communication Tools	Portable communication devices such as portable computers (laptops, notebooks, palm held, etc.) with

remote dialup capabilities, wireless phones, pagers, fax devices, etc.

Project Management Software that automates workforce management and project coordination, including distributed project management, support for mobile working, sales force automation.

Web Browser Software which is used for viewing web pages and multimedia content, downloading applications and documents as well as providing information in web form and uploading documents to a web server.

Note. Adapted from Ballentine, Becker, Lee & Townsley, 1999.

Work Group and Team Tasks & Activities

Social psychologist Joseph McGrath (1984) suggests four basic types of tasks performed by groups: generating, choosing, negotiating, and executing (see Table 3).

Table 3

Group Tasks

Team Tasks	Interaction
Generating tasks	Includes creating plans and brainstorming ideas
Choosing tasks	Includes solving problems and making decisions.
Negotiating tasks	Includes dealing with opposing viewpoints and resolving conflict.
Executing tasks	Includes taking action and implementing plans.

Note. Adapted from McGrath, 1984.

Looked at sequentially, these tasks reflect a team’s natural work cycle. For example, teams typically begin their work by making plans and brainstorming ideas, then move into decision-making and problem-solving, which often leads to conflict, and then action and implementation planning. Once a team has identified the type of task or activity they’re involved in, they are better equipped to select appropriate tools and processes to facilitate their work.

More recently, Stevens and Campion (1994) conducted an extensive review of the team literature and identified five sub-categories of teamwork knowledge, skills, and abilities (KSAs), which include conflict resolution, collaborative problem solving, communication, goal setting and performance management, and planning and task coordination. These categories provide us with a snapshot of teamwork activities that occur in all types of teams.

Table 4

Knowledge, Skills, and Abilities Required in Teamwork

Interpersonal KSAs	Definition
1. Conflict Resolution	Recognize and encourage desirable team conflict, while discouraging undesirable conflict.
2. Collaborative Problem Solving	Identify when problems require the participation of the entire team and when they don't. Ability to overcome barriers to group problem solving.
3. Communication	Communicate openly and honestly. Ability to

listen and to interpret nonverbal messages.

Self-Management KSAs	Definition
4. Goal Setting & Performance Management	Monitor, evaluate, and provide feedback on the performance of the team and individual members.
5. Planning and Task Coordination	Coordinate and synchronize individual activities and distribute information appropriately. Establish expectations for the team and balance workload among members.

Note. Adapted from Stevens and Campion, 1994.

Team Effectiveness

Work teams are essential to a new breed of high-involvement organization, one that is evolving in an environment of global competition, rapidly evolving technology, and rising customer expectations. Organizations stay competitive by improving the quality of their products and services while reducing costs, offering faster service, and getting new products to market more quickly. Achieving these advances has meant capitalizing on the talents, ideas, and energy of employees at all levels (Sundstrom & Associates, 1999). Companies report impressive successes with teams, especially in the areas of error and cycle time reduction, productivity gains, and improved response times and work processes (Wellins, Byham, & Dixon, 1994; Katzenbach & Smith, 1993).

Effective work teams meet the performance expectations of those who receive, use, or review the team's output (Hackman, 1990; Guzzo & Shea, 1992). Work teams

usually deliver one of four kinds of outputs to their customers. These outputs, which include tangible objects, decisions or recommendations, or service transactions, are measured in terms of quantity, quality, timeliness, cost, and responsiveness of service (Sundstrom & Associates, 1999).

For teams, effectiveness also includes meeting members' own expectations of satisfying work and working relationships (Sundstrom & Associates, 1999). If a team experiences divisive interpersonal conflict and handles it poorly, for example, its members may want to leave (Hackman, 1987). Sundstrom & Associates (1999) provide a practical definition of team effectiveness as "the extent to which a work team meets the performance expectations of key counterparts, including managers, customers, and others, while continuing to meet members' expectations of working with the team" (p.10).

Traditional teams rely on frequent face-to-face meetings to support their processes. These face-to-face interactions help the team members feel and act like a team. Applying the principles of effective teamwork to virtual teams has stretched the conventional wisdom about teams to its limit (Zack & Serino, 1996). Virtual teams need additional help to support their team processes because team member's interactions are primarily conducted through computer and telecommunications technology. Technology provides the foundation for virtual teamwork but the real challenge to virtual team effectiveness is learning how to work with these new technologies (Townsend et al., 1998).

Electronic communication modes have different characteristics than face-to-face conversations, and they require team members to choose an appropriate mode to fit the situation. Research indicates that when traditional communicative cues, (e.g., facial

expression, gesture, and vocal inflection) are absent, communication dynamics are substantially altered. For example, in teams where members' primary interactions are through some form of electronic mail, the absence of traditional communicative cues make subtleties in communication more difficult to convey (Kiesler & Sproull, 1992).

Increasing Effectiveness Through Collaborative Technologies

The conditions under which a team operates influences how a team performs its work, and how well the team goes about its work influences the quality of its overall performance. If a team's process is effective, and if the work conditions are favorable, then the team has a greater chance of performing effectively.

The Lotus Institute reports that collaborative, or team-support technology can directly influence effectiveness. Applications which provide electronic forums where the team can discuss its mission, performance standards, and expectations, facilitates mutual accountability and provide electronic communications which can improve the coordination, synchronization, and integration of effort (Zack & Serino, 1996).

Collaborative technologies can also ensure that there is an adequate level and mix of knowledge, skill and experience applied to the work. The technologies can provide access to expertise via computer conferencing, electronic mail, skills or experience databases, or information and knowledge repositories. Some teams use the technology to match available skills to their requirements via skills databases. Others discuss and archive what they learn during electronic debriefing sessions (Zack & Serino, 1996).

Teams can use collaborative technologies to develop appropriate performance strategies. An application may provide structured processes for generating, evaluating, and choosing strategies, offer electronic forums for discussions, and/or serve as a

repository for capturing and discussing models of the task situation. Furthermore, teams could electronically post and discuss goals and objectives or create an electronic repository for storing results of prior strategies (Zack & Serino, 1996).

And finally, collaborative technologies can help support effective communication by offering teams flexible communication modes that transcend temporal, spatial, and organizational distance. Collaborative technologies support a range of essential communication modes including electronic mail, conferences, discussion databases and shared document repository (Zack & Serino, 1996). Collaborative tools are a powerful resource and are indispensable to virtual teams, however, it is important that these team technologies not be treated as merely an add-on to team design. Instead, technologies that support work teams must be integrated into and aligned with team design, behavior, and processes (Horvath & Duarte, 1997).

Support Systems

Decades of experience and research suggest that effective work teams need several kinds of support, including an organizational infrastructure compatible with team work (Sundstrom & Associates, 1999). Systematic processes provide a basis for collaborative work, build in the steps to ensure high quality, and prevent employees from having to reinvent procedures. Organizing around processes emphasizes how things are done within an organization, rather than what is done, and support systems are enablers of systematic processes (Mohrman et al., 1995). Sundstrom & Associates (1999) have identified nine essential support systems that are directly linked to a team's potential effectiveness (see Table 5).

Table 5

Team Support Systems

Support System	Description
Correct Team Structures	Refers to a team's responsibilities, scope, authority, resources, accountability, and reporting relationships.
Staffing	Systems to identify individual and teamwork position requirements.
Leader Roles	Teams need leaders to align and coordinate the work of teams while providing direction and coaching.
Training	Teams need training in teamwork and team liaison skills.
Measurement	Systems that give teams specific and timely feedback on performance.
Reward	Systems that give adequate incentives for individual and team performance, plus incentives for cooperation among teams.
Information	Systems with convenient, responsive datalinks for team members and their external counterparts.
Communication Technology	Technologies that support internal and external team interactions and decisions, especially in

virtual teams.

Facilities
Facilities that allow appropriate face-to-face
interaction within and among teams.

Note. Adapted from Sundstrom & Associates, 1999.

Additionally, further research on traditional teams (Hall, Johnson, & Beyerlein, 2000) indicates that the presence of nine similar support systems increases team effectiveness. The presence and importance of the nine support systems were correlated with team composite effectiveness scores, indicating that Group Design, Defining Performance, Information, and Performance Appraisal as the top four support systems whose presence had the most impact on team effectiveness (See Table 6).

Table 6

Correlations between Support System Presence or Importance Scores and Team Composite Effectiveness Scores

Support System	Presence	Importance
Group Design	.63	.23
Defining Performance	.61	.21
Information	.57	.19
Performance Appraisal	.53	.12
Integration	.52	.18
Direct Supervisor	.48	.17
Executive & Manager	.46	.08
Training	.43	.21

Note. Adapted from Hall et al., 2000

There are many similarities between these two support system taxonomies, specifically in the areas of Training, Information, Performance Measurement and Reward, Leaders' Roles, and Group Design (see Table 7).

Table 7

Comparison of Support System Taxonomies

Sundstrom & Associates, 1999	Hall, Beyerlein, & Johnson, 2000
Training	Training
Information	Information
Measurement & Feedback	Performance Appraisal
Reward	Reward
Leaders' Roles	Executive & Management Support
	Direct Supervisor Support
Team Structure	Group Design
Staffing	Group Design

Note. Adapted from a presentation by Hall, Johnson, & Beyerlein, 2000.

This study will focus primarily on the support systems common to both Sundstrom (1999) and Hall et al. (2000), paying special attention to those systems that appear to have particular relevance for virtual teams. Additionally, because of their importance to virtual teams, other organizational systems, such as the changing nature of information technology roles, will be considered as possible virtual team effectiveness facilitators (Mankin et al., 1996).

Training

Teams need training that provides members with the necessary teamwork and team liaison skills. Stevens and Campion (1994) conducted an extensive review of the literature and identified two major categories and five subcategories of knowledge, skills, and abilities (KSAs) required in teamwork (see Table 4, page 10).

The traditional factors identified with high performing teams are important in the virtual environment as well. Effective communication skills, clarity of goals, and a focus on performance will continue to be critical attributes for virtual team members (Scott & Townsend, 1994). In order to take full advantage of the new environment, virtual team members will require basic teamwork training and development, and will also need training in team technologies. In addition, when team members are from different nationalities and cultures, they must be taught how each of their respective cultures differ and how they can overcome these differences and use them to the team's advantage (Townsend et al, 1998).

Information and Communication Technologies

Different types of work teams will need different kinds of support. While information is critical for all teams, different types of teams will need different kinds of information at different times. For example, a production team will require up-to-the-minute information on current supplies of product parts, while a product development team will need information with perhaps less time urgency, but from many more sources. For virtual teams, their very existence depends on effective information and communication technology systems (Sundstrom & Associates, 1999, Mankin et al, 1996).

The increased performance pressures that come with teamwork carry with them a need for a more efficient and effective method of processing information throughout the organization (Katzenbach & Smith, 1993; Mohrman et al., 1995). As work becomes more knowledge-based, meaning it requires more thinking activities such as problem-solving, idea generation, or analyzing (Fisher and Fisher, 1998), team members need tools to help them gain access to information, manage and analyze it, share it among themselves, and communicate it to others (Sundstrom & Associates, 1999).

Mohrman et al. (1995) found that the higher the adequacy of information technology, the better the teams performed. Adequacy was measured in terms of the extent to which people were both electronically connected to the people with whom they had to work and shared common languages and databases. Among the benefits cited for computer systems were the ability to communicate within and between teams and with customers, suppliers, and partners via computer networks and the widespread or universal access to databases.

Information is important to teams because it allows effective problem solving and decision-making. All teams need access to information to be effective. With the recent advances in information technologies, however, one of the biggest challenges teams face today is not getting enough information, but avoiding information overload. With the proliferation of information systems such as email and company Intranets, workers are being challenged every day to find ways to manage the flood of information coming their way (Fisher & Fisher, 1998).

New Roles for IT Staff Functions

Information technologies are creating changes for teams and other workers in organizations. The onrushing waves of technological changes sweeping over IT functions are changing the way some IT staff members view their role. Like never before, IT professionals must now work in partnership with the business units and teams the IT department serves. This new role for IT staff requires technically skilled individuals who can reach out to clients and identify potential problems and opportunities, speak the client's language and interpret his or her needs, adopt a cross-functional perspective, and focus on client needs rather than on his or her own technology preferences (Mankin, et al., 1996).

Building these collaborative relationships will require organizational support in terms of encouraging, enabling, and reinforcing the kinds of changes required. For example, organizations may find it necessary to deploy some centralized IT resources, e.g., money and people, to the user departments and teams they support. Furthermore, the kinds of cross-functional, collaborative skills and behaviors required for the new role of the IT professional will need to be communicated and taught (Mankin, et al., 1996).

Electronic collaboration technologies, such as electronic mail, discussion databases, and video conferencing, allow people separated by time or distance to share information, generate ideas, make decisions, and store their work for later retrieval. Collaborating with electronic tools requires teams to rethink how they interact and how they organize their work. Communication technology must support internal and external team interactions and decisions, especially in virtual teams with geographically separated members (Sundstrom & Associates, 1999).

Individuals need to communicate easily and rapidly not just with team members and coworkers in their own companies, but with customers, suppliers, strategic partners, and colleagues in other organizations (Mankin et al., 1996). Communication technologies as they exist today support four forms of team interaction: (a) face-to-face meetings at the same time and place; (b) meetings at the same time from different places, e.g., videoconferences; (c) communication at a different times through the same place, e.g., a team whose members work different shifts in a power plant control room; and (d) communication at different times from different places, e.g., such as email (Sundstrom & Associates, 1999; Coleman, 1997).

Most companies discover that although communication technologies provide an opportunity for greatly increasing the amount of information shared, they may not necessarily improve communication effectiveness. One-way communication such as newsletters and electronic bulletin boards cannot substitute for two-way communication in face-to-face settings where people can ask questions, debate issues, or solve problems together. Furthermore, technical noise, like telephone line static, can cloud what a communication sender wants to communicate (Fisher & Fisher, 1998).

Even more difficult to reduce than technical noise, however, is the social noise in information or knowledge transfer. Social noise includes things like individual perceptions, assumptions, and emotions that can affect a message transfer. The same words, context, or examples used by the communication sender may have a completely different meaning to the receiver as a result of his own life experience, perceptions, and even culture (Fisher & Fisher, 1998).

All team members need “tools” to help them access, manage, communicate, and apply the information they require. Teams that are separated by time, distance, space, and organizational boundaries, cannot survive without them. Information and communication technologies provide the critical link between the members of dispersed or virtual work teams and between the teams and their organization (Mankin et al., 1996).

Performance Measurement & Appraisal

A critical first step in moving from competition between individual performers to collaboration among team members is to change how performance is measured. The very process of assessing team performance can have a significant impact (Mankin et al, 1996). Teams need specific, timely measurement and feedback systems that allow them to track their progress, solve problems, and obtain feedback on their performance. Sundstrom & Associates (1999) suggest that to be effective, teams must first have the right measures, i.e., measures that meet customer's needs, align with business strategy and afford the team some control. Then, the team must understand the measures, have ownership of them, and actively use them for problem solving. Finally, the team's management has to believe in the measures and support the team's improvement efforts.

In terms of practical application, Mankin et al. (1996) report that teams and their managers should identify and define team goals as well as the methods for measuring progress toward these goals; add criteria to performance appraisals for individual team members that are related to their contribution to team performance; eliminate evaluation procedures, such as ranking, that put individual team members in competition with each other; and, assess team performance and individual contributions to team performance,

incorporating input from managers, team members, and customers, as well as others with whom the team collaborates.

Mohrman et al. (1995) repeatedly found that the degree to which performance measures are put into place are strongly related to subsequent performance. But before performance measures can be put into place, performance must first be defined. The process of defining performance establishes what performance is supposed to be (i.e., what performers are supposed to do).

Traditionally, organizations have relied on such things as job descriptions, goals, and standards to define the performances that need to be achieved. Business-unit strategies, business plans, team goals, and team missions are also examples of performance definitions. Once performance is defined, metrics and various measurement approaches can be used to determine the extent to which performance occurs as designated (Mohrman et al., 1995).

Reward Systems

Reward systems must give adequate incentives for individual and team performance, plus incentives for cooperation among teams. For teams to be most effective a reward system must recognize the kinds of behavior and skills that are needed. Because teams differ, no reward system design is universally effective. The key is to design a system that fits the characteristics of the team and the organizational context in which it operates (Sundstrom & Associates, 1999).

Some rewards are intrinsic in nature. For example, people can get a good feeling simply by performing well, either as individuals or as members of effective teams and business units. Other rewards are extrinsic, such as formal rewards and compensation

practices that give performers something of value as a result of their performance. Teams and business units can get rewards just as individuals can. In fact, the most effective recognition programs are those that recognize outstanding individuals but also reward the collaborative efforts of the team (Parker, 1994). These rewards might come in the form of team recognition, incentives, profit sharing, or gainsharing (Mohrman et al., 1995).

Two general approaches to compensation seem to fit best with teams. One emphasizes paying the individual instead of the job, and the second is a pay-for-performance approach that focuses on collective performance more than individual performance. Taken together, these two generic approaches encourage individuals to learn the right skills to make teams effective, and they motivate the right type of performance focus on the part of individual teams and organizations (Sundstrom & Associates, 1999).

Management and Leaders' Roles

As organizations have become more dynamic and team-based over the last few years, leadership roles have changed. To be effective, leaders and managers now need to use a greater variety of influence strategies, such as consensus building and persuasion. Leadership roles exist in all groups, even self-managing teams. Team leader roles align and coordinate the work of multiple teams while giving each team the direction and coaching its members need. According to Sundstrom & Associates (1999) a leader role is “a formalized position of authority that is responsible for linking the team to its external constituencies, stakeholders, and larger external environment, establishing strategic and operational directions for team action based on these linkages, and facilitating team operations to accomplish these directions” (p. 96).

To provide the vision and direction needed to lead the organization into the twenty-first century, leaders must understand the synergies that can result from their two most important strategic resources: people and technologies. Leaders cannot do this unless they are committed to learning about these resources in a very personal way. All members of the senior management team have to model the behaviors they expect from those they manage, therefore, they have to use the collaborative technologies and work together as a team. In doing so, they will better understand the nature and implications of the changes they are leading, and will be able to lead the way for the rest of the organization by their example (Mankin et al, 1996).

Team Structure, Group Design & Staffing

Selecting individuals to be members of a work team presents special challenges. Staffing a team calls for identifying individual position requirements as well as teamwork requirements. Individual position requirements are those capabilities important for performing the specific tasks for which a team member would be responsible. Teamwork or team-relevant requirements refer to the individual's ability to interact with and work with others in a coordinated and collaborative fashion, and those needed for the specific team context. Adding to the complexity of team staffing is the fact that staffing requirements and needs vary, depending on the type of work team (Sundstrom & Associates, 1999).

Because virtual teams are unrestrained by geography, team staffing and group design takes on a new meaning. One of the advantages of working virtually is that teams are not limited to members who are located in one particular place. Instead, team membership can be based on required knowledge, skills, and experiences. In

postindustrial economies, the raw material is information, the product is knowledge, the machinery is the computer, and physical labor is replaced by intellectual effort.

Technology has expanded the options for work design (Mankin et al., 1996).

Organizational Support Systems and Virtual Team Effectiveness

One of the major causes of team failure is the lack of organizational support (Mohrman et al., 1995; Sundstrom & Associates, 1999). Because most of the current research and literature focuses on traditional work teams it is not clear whether or not the same organizational support systems will prove to be as critical to the success of virtual teams. Organizations trying to integrate technology and teams must make the kinds of changes in their infrastructure that encourage people to work together, move forward, and innovate (Mankin et al., 1996).

Because forming and working as a virtual team requires accommodation to the differences that result from not being face-to-face, it is likely that there will be corresponding differences in the organizational systems that support virtual teams. While there is little empirical research to draw from at this time, it only follows that the effectiveness of virtual teams will be limited unless the overall organization makes changes to their systems that support their virtual teams as well. Organizations need to implement macro-level changes to complement the micro-level changes that occur as a result of virtual teaming (Mankin et al., 1996).

Types of organizational support systems included in this study were drawn from a comprehensive review of the current literature available on both virtual teams and traditional teams and include:

- 1) Assessing collaborative work group performance (Mankin et al, 1996; Sundstrom & Associates,1999; Hall et al, 2000);
- 2) Rewarding collaborative work group performance (Sundstrom & Associates,1999; Hall et al, 2000);
- 3) Developing lateral paths of career progression (Mankin et al, 1996);
- 4) HR policies and practices, such as training (Sundstrom & Associates,1999; Hall, 2000, Mankin et al, 1996);
- 5) New roles for IT functions (Mankin et al, 1996);
- 6) Organizational restructuring (Sundstrom & Associates,1999; Mankin et al, 1996);
- 7) New roles for senior managers (Mankin et al, 1996);
- 8) Connecting customers and/or suppliers to the organization with collaborative technologies (Sundstrom & Associates,1999; Mankin et al, 1996).

Team effectiveness is measured in the following team activities:

- 1) Communication (Stevens & Campion, 1994; McGrath, 1984);
- 2) Planning tasks and setting goals (Stevens & Campion, 1994; McGrath, 1984);
- 3) Problem solving and decision making (Stevens & Campion, 1994; McGrath, 1984);
- 4) Resolving conflict (Stevens and Campion, 1994; Sundstrom and Associates, 1999; McGrath, 1984);
- 5) Responding to customer requirements (Mohrman, Cohen, & Mohrman, 1995; Sundstrom & Associates, 1999;).

Hypotheses

To examine the effects of different organizational support systems on virtual team effectiveness, this study will investigate the following hypotheses:

1) Organizations that have implemented changes in their support systems to accommodate virtual teams will rate their virtual teams more effective overall than organizations that have not implemented support system changes.

2) Organizations that have implemented more changes in their support systems will rate their virtual teams more effective overall than organizations that have implemented fewer support system changes.

3) Organizations that have made changes to different support systems will rate their virtual teams as more effective overall.

4) Organizations that consider themselves effective at developing support systems and have implemented more support system changes will rate their virtual teams as more effective overall.

CHAPTER 3

MATERIALS AND METHODS

Participants

Approximately 180 questionnaires were sent to 60 companies between November 1998 and December 1999. Fifty-two usable surveys were completed and returned, representing 43 companies. Industries responding included oil & gas, manufacturing, consulting, computing technology, financial services, telecommunications, and healthcare companies. The largest group of respondents were Information Technology (IT) managers and directors (46% of the sample), followed by Chief Information Officers (CIO's) and Vice-President's (19%). The average age of the respondents was 44 and the majority were male (71%). Participants were treated in accordance with the UNT Institutional Review Board's (IRB) ethical practices regarding research involving human subjects. The IRB board determined our survey posed minimal risk to participants.

Survey Materials

Data were collected using a 12-page survey designed, developed, and administered by a project team, which included members from UNT's Center for the Study of Work Teams (CSWT), and one member from UNT's Information Systems Research Center (ISRC). The complete survey is available in the Appendix.

Information obtained during interviews with our sponsoring organization, and a thorough review of the literature on work teams and collaborative technologies helped us develop the survey questions and content. After multiple meetings and reviews with our

sponsoring organization's project leaders, the survey was expanded to include collaborative work groups that did not necessarily fit the strict definition of a work team or a virtual team. The project team and the client believed that the study would generate greater participation using the more generic term "collaborative work group", rather than the term "virtual team". While researchers and other experts on work teams recognize that significant differences exist between work teams and work groups, for purposes of this study, the terms will be used interchangeably.

The survey was designed for Information Technology (IT) managers and users of collaborative technologies, and included the following components: a glossary of terms; demographic information on the organization and individual; the organizations' use of, as well as individual personal involvement in, technology-supported collaborative work groups; collaborative tools usage; collaborative tools and work group activities; organizational support systems; collaborative technology management and support; and future use of collaborative tools.

The questions in the survey that are relevant to my study concern organization-wide virtual team effectiveness and organizational support systems (questions 6, 18, and 20b). Virtual Team effectiveness was rated in the following areas: 1) Communication, 2) Planning tasks & setting goals; 3) Solving problems & making decisions; 4) Resolving conflict; and 5) Responding to customer requirements. Ratings were chosen from a 4-point Likert scale, where 1=Not effective, 2=Somewhat effective; 3=Effective; and 4=Very Effective. Types of organizational support systems included in this study were: 1) Assessing collaborative work group performance; 2) Rewarding collaborative work group performance; 3) Developing lateral paths of career progression; 4) HR policies and

practices; 5) New roles for IT functions; 6) Organization restructured to promote collaborative work across time and distance; 7) New roles for senior managers; and, 8) Connecting customers and/or suppliers to the organization with collaborative technologies. Both the independent variable and the dependent variables used in the analysis will come from the same survey instrument.

Procedure

In August of 1998 the Center for the Study of Work Teams (CSWT) and the Information Systems Research Center (ISRS) at the University of North Texas contracted with a corporate sponsor to conduct a benchmarking study of collaborative technologies and teams across different industries. This study centered on three key questions, some with multiple subparts. The three questions were as follows:

1. What collaborative tools are being used by other firms and for what purpose?
 - ◆ How frequently are they being used?
 - ◆ What percentage of the company population is using each tool?
2. Which collaborative tools have been most successful for the purpose in which they were implemented and why?
3. Compare each firm's suite of collaborative tools and virtual teaming efforts with general industry.

A comprehensive survey was developed after an internal assessment of the corporate sponsor's organization and an extensive review of the relevant literature. The survey was pilot tested by five Chief Information Officers of independent organizations. Feedback from the pilot was used to further refine the survey, which was completed on October 20, 1998.

The UNT team contacted corporate sponsors of both the Center for the Study of Work Teams (CSWT) and the Information Systems Research Center (ISRC) to participate in the study. Additional participants were solicited through postings on the CSWT's TeamNet Listserv, the CSWT's Web site, and through personal contacts. In order to increase participation, participants were guaranteed their anonymity and a summary of the findings.

CHAPTER 3

RESULTS AND DISCUSSION

H1: A one-way multivariate analysis of variance (MANOVA) was conducted to determine the effect of changes to support systems (yes/no) on the five dependent variables of effectiveness: communication, planning tasks and setting goals, solving problems and making decisions, resolving conflict, and responding to customer requirements. Areas of team effectiveness were rated on a 4-point Likert scale where 1=Not effective, 2=Somewhat effective; 3=Effective; and 4=Very Effective. With an alpha level of .05, no significant differences among the effectiveness means were found, Wilks' $\Lambda = .95$, $F(5, 42) = .43$, $p > .05$. Table 8 contains the effectiveness means and the standard deviations for the support system grouping variables of yes/no. Thus, the hypothesis that organizations that have implemented changes in their support systems to accommodate virtual teams will rate their virtual teams more effective overall was not confirmed.

Table 8

Descriptive Statistics for Effectiveness Means and Support System Changes

	Support System	Mean	SD	<u>N</u>
Communication	Yes	2.74	.76	27
	No	2.71	.72	21
	Total	2.73	.74	48
Resolving conflict	Yes	2.15	.86	27
	No	2.19	1.03	21
	Total	2.17	.93	48
Planning tasks & setting goals	Yes	2.89	.75	27
	No	2.71	.72	21
	Total	2.81	.73	48
Problem solving & making decisions	Yes	2.67	.78	27
	No	2.62	.74	21
	Total	2.65	.76	48
Responding to customers	Yes	2.93	.73	27
	No	2.76	.77	21
	Total	2.85	.74	48

H2: Since the MANOVA was not significant, a 2-tailed correlation was conducted that included only those organizations that indicated they had made changes in the support systems (i.e., those that answered “yes” to question 18). Results show a medium to large correlation, $r(25) = .35$, $p > .05$, though still not significant at the .05 level.

H3: Using an alpha level of .05, a series of independent-sample t -tests were then conducted to evaluate the hypothesis that organizations that have made specific types of changes to their team support systems will rate their virtual teams higher in overall effectiveness. For example, does assessing the performance of virtual teams increase their overall effectiveness? For this analysis the effectiveness ratings were summed, allowing for a score ranging from a minimum of 5 (i.e., all 5 areas of effectiveness received a score of 1= Not Effective) to a maximum of 20 (i.e., all 5 areas of effectiveness received a score of 4 = Very Effective). Significantly higher levels of effectiveness were found among organizations that had developed new roles for IT staff functions, $t(46) = 2.14$, $p = .038$. Organizations that had developed new roles for IT staff functions e.g., from IT expert to cross-functional collaborator, ($M = 14.77$, $SD = 2.65$) had more effective virtual teams than those who had not ($M = 12.63$, $SD = 3.22$). Figure 1 shows the distributions of the two groups.

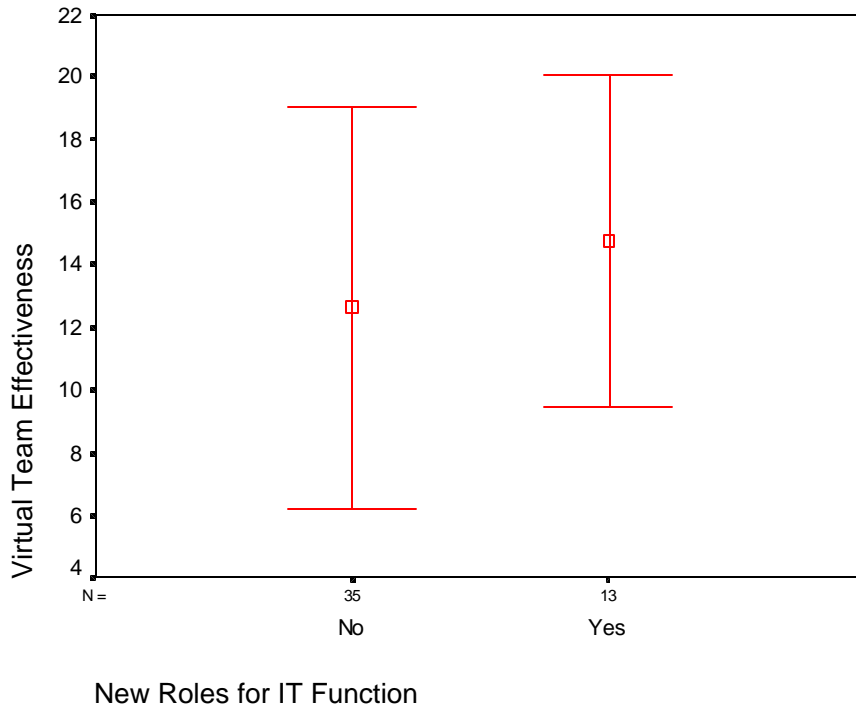


Figure 1. Error bars (two standard deviations above and below the mean) for the effectiveness ratings for each new roles for IT functions group.

Additionally, significantly higher levels of effectiveness were found among organizations that had developed new roles for senior managers e.g., becoming part of a technology-based collaborative work group, and for senior managers, $t(46) = 2.14$, $p = .038$. Organizations that had developed new roles for senior managers ($M = 14.77$, $SD = 2.92$) had more effective virtual teams than those who had not ($M = 12.63$, $SD = 3.14$). Figure 2 shows these distributions.

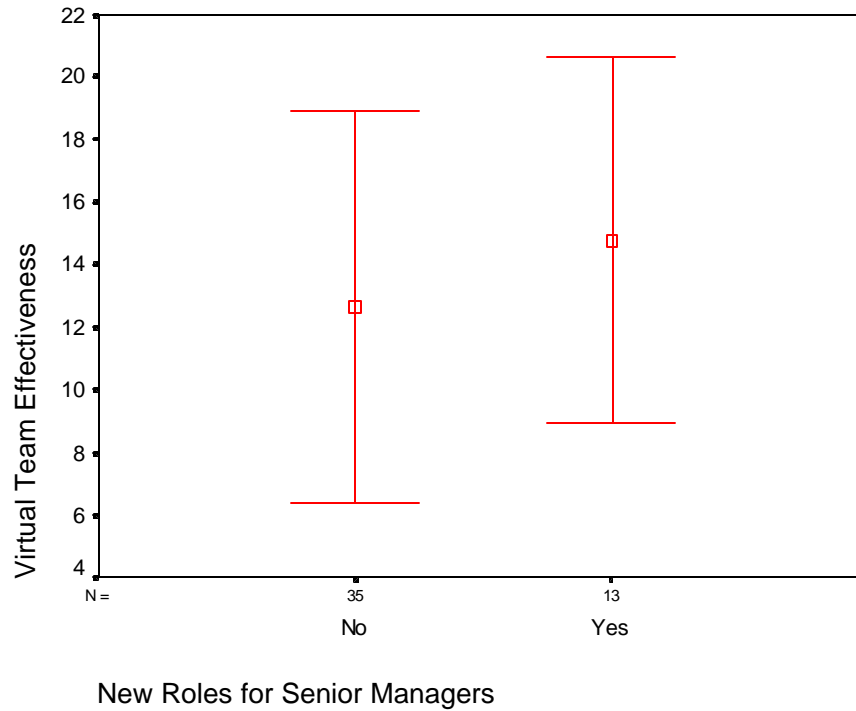


Figure 2. Error bars (two standard deviations above and below the mean) for the effectiveness ratings for each new roles for senior managers group.

The eta square index for both t -tests indicated that 9% of the variance of the effectiveness variables was accounted for by whether or not an organization had developed new roles. Table 9 contains the effectiveness means and the standard deviations for the support system grouping variables of yes/no.

Table 9

Descriptive Statistics for Changes to Specific Support Systems and Effectiveness Means

Support System	Changes	Mean	SD	N
Assessing Performance	Yes	14.46	3.33	13
	No	12.74	3.06	35
Rewarding Performance	Yes	13.08	3.00	12
	No	13.25	3.30	36
Lateral Career Paths	Yes	14.00	2.74	17
	No	12.77	3.38	31
HR Policies & Practices	Yes	14.14	2.85	14
	No	12.82	3.29	34
IT Roles	Yes	14.77	2.65	13
	No	12.63	3.22	35
Organization Restructured	Yes	13.47	3.34	15
	No	13.09	3.18	33
New Manager Roles	Yes	14.77	2.92	13
	No	12.63	3.14	35
Connecting Customers & Suppliers	Yes	13.61	3.13	18
	No	12.97	3.26	30

Because there were significant differences in overall effectiveness among organizations that had made changes in these two support systems (developing new roles functions and new roles for senior managers) additional t -tests were conducted to explore

whether or not differences would be found among the different areas of effectiveness. For example, looking only at companies who had made changes in their IT functions, are their virtual teams more effective in the area of resolving conflict? Organizations that had developed new roles for IT staff functions rated their virtual teams significantly more effective at planning tasks & setting goals, $t(46) = 2.03$, $p = .048$. The eta square index indicated that 8% of the variance of the planning tasks & setting goals variable was accounted for by the whether or not an organization had developed new roles.

Additionally, organizations that had developed new roles for senior managers rated their virtual teams significantly more effective at planning tasks & setting goals, $t(46) = 2.03$, $p = .048$, solving problems & making decisions, $t(46) = 2.54$, $p = .015$, and responding to customer requirements, $t(46) = 2.23$, $p = .031$. Eta square indices were 8%, 12%, and 10% respectively. Descriptive statistics are shown in Table 10.

Table 10

Areas of Effectiveness and Support System Changes in New Roles

Effectiveness	New Roles for IT Function	Mean	SD	<u>N</u>
Communication	Yes	2.92	.76	13
	No	2.66	.73	35
Planning tasks & setting goals	Yes	3.15	.69	13
	No	2.69	.72	35
Solving problems & making decisions	Yes	3.0	.71	13
	No	2.51	.74	35
Resolving conflict	Yes	2.54	.88	13
	No	2.03	.92	35
Responding to customer requirements	Yes	3.15	.55	13
	No	2.74	.78	35
Effectiveness	New Roles for Senior Mgrs.	Mean	SD	<u>N</u>
Communication	Yes	2.85	.80	13
	No	2.69	.72	35
Planning tasks & setting goals	Yes	3.15	.80	13
	No	2.69	.68	35
Solving problems & making decisions	Yes	3.08	.76	13
	No	2.49	.70	35
Resolving conflict	Yes	2.46	.88	13
	No	2.06	.94	35
Responding to customers	Yes	3.23	.60	13
	No	2.71	.75	35

H4: A correlation coefficient was computed between the overall effectiveness variable and a new variable calculated by multiplying the number of support system changes by effectiveness at developing support systems (questions 6, 18, and 20b). Results show a small to medium correlation, $r(46) = .21$, $p > .05$, which was not significant at the .05 level.

CHAPTER 4

RESULTS AND DISCUSSION

The first hypothesis that organizations that have implemented changes in their support systems will rate their virtual teams more effective overall was not confirmed. However, with the exception of the effectiveness area of Resolving Conflict, the overall effectiveness means for organizations that had made changes to their support systems were higher than the means for organizations that had not; therefore, a significant difference might have been found had the sample size been larger.

The second hypothesis that organizations that have implemented more changes in their support systems will rate their virtual teams more effective overall than organizations that have implemented fewer support system changes was not confirmed. An additional 2-tailed correlation that included only those organizations that indicated they had made changes in the support systems resulted in a medium to large correlation, however, indicating that significant differences might have been found had the sample size been larger.

The third hypothesis that organizations that have made changes to specific support systems will rate their virtual teams as more effective in specific areas was confirmed. Significantly higher levels of effectiveness were found among those organizations that had developed new roles for IT functions and senior managers. Specifically, organizations that had developed new roles for IT functions rated their virtual teams significantly more effective at planning tasks & setting goals. The

technological changes sweeping over IT staff functions are changing the way IT professionals work with the business units and teams the IT department serves. This new role requires technically skilled individuals who can identify potential problems and opportunities and interpret team member and customer needs from a cross functional perspective (Mankin, et al., 1996). Perhaps it is this cross-functional perspective combined with specialized information technology skills that facilitates virtual teams' planning and goal setting activities.

Organizations that had developed new roles for senior managers rated their virtual teams significantly more effective at planning tasks & setting goals, solving problems & making decisions, and responding to customer requirements. By using the collaborative technologies and working together as a team, senior managers model behaviors that they expect from those they manager, and can better lead the way for the rest of their organization (Mankin et al, 1996).

The fourth hypothesis that organizations that consider themselves effective at developing support systems and that have implemented more support system changes will rate their virtual teams as more effective was not confirmed. This could be due to the fact that support system development is not traditionally a virtual team member role, and the respondents, therefore, may not have had enough information to accurately answer the question.

It is interesting that both of the support systems that had a significant relationship with virtual team effectiveness deal with changing roles. This seems to suggest that virtual teams require different kinds of support than what is traditionally offered by senior managers and IT functions. However, it should be pointed out that the majority of

survey respondents (46%) were IT managers and directors, and it is possible that this influenced the results. Further research would be necessary to validate the results and to identify the specific requirements of these new roles.

APPENDIX

COLLABORATIVE WORK GROUP TECHNOLOGY SURVEY

Collaborative Work Group Technology Survey

Conducted by

**University of North Texas
Center for the Study of Work Teams
and
Information Systems Research Center**

Study Team Members

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University of North Texas
College of Arts and Sciences
Department of Psychology
Interdisciplinary Center for the Study of Work Teams

October 22, 1998

Collaborative Work Group Technology Survey

Dear Survey Participant:

In our global economy groups of people must work together despite being separated by time and distance, and computer-based technologies (e.g., groupware) are being used to support them. Because of this growing need, a benchmarking study is being conducted by the University of North Texas Center for the Study of Work Teams and Information Systems Research Center to determine how computer-based collaborative tools are being used to support dispersed work groups. We are surveying information technology experts (i.e., IT managers) and users (i.e., collaborative work group members) in several companies to determine best practice answers to the following questions:

- *What collaborative tools and technologies are being used and for what purposes?*
- *To what extent are they being used?*
- *Which tools have been most successful and why?*
- *How do companies organize and manage their collaborative technology efforts?*
- *What support practices (e.g., training) are associated with successful collaborative technology implementations and why?*

Please complete the attached survey and return it to the study team in the enclosed envelope by November 20, 1998. As always, we guarantee the complete anonymity of all participants. To help ensure a common framework for respondents, we have enclosed a glossary of terms in the survey. If you are not be able to answer questions for the whole company, please respond at the level that you have the most knowledge of collaborative work groups and their use of technology. Your company will receive a summary of our findings, including a review of the relevant literature and a description of how collaborative technology tools are being used.

If you know of technology experts and users in your company that we should reach to get a more accurate view throughout your company, please forward their names to a study team member listed on the cover page of the attached survey. Thanks in advance for participating in this study. If you have any questions, please contact your company point of contact or a member of the study team.

Sincerely,



Collaborative Work/Group Technology Study Team

Enclosure

P.O. Box 311280 • Denton, Texas 76203-1280
Phone (940) 565-3096 • Fax (940) 565-4806 • TDD (800) 735-2989
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Collaborative Work Group Technology Survey

Glossary of Terms

Audio Conferencing

Holding meetings usually by means of a standard telephone line with parties able to call in from different locations at the same time. An example would be a typical telephone conference call.

Collaborative Presentation Software

Computer programs which permit many people to view a single presentation at the same time.

Collaborative Work Group

A group of individuals that truly share information and work to create a common understanding in order to accomplish a mutually shared work objective.

Conference Room Videoconferencing

Holding meetings in a conference room using live video, essentially a telephone system with an additional visual component.

Desktop Videoconferencing

Provides two-way audio/video conferencing using a PC-based system with near-broadcast quality. Allows point-to-point, spontaneous, very cost effective communication.

Discussion Database

Databases that allow the capture and storage of an electronic discussion on designated subjects.

Document Management

Electronic document capture and delivery, including the capability to view, print, copy, mark-up, and edit documents electronically. Functionality could include electronic imaging, optical character recognition, web related functionality, indexing, intelligent data searching and workflow design tools.

Electronic Whiteboarding

Allows two or more people to view and draw on a shared drawing surface, in the same room or in geographically separated locations. Messages written on the board's surface are automatically transcribed electronically.

E-mail/Electronic Messaging

Computer application which allows people to interact with one another, usually through a keyboard and monitor interface. At its most basic level, E-mail allows end-users to create, send, and receive messages. File transfers are also possible.

Face-to-Face (FtF)

The traditional ability to collaborate in person with others to get your group work done.

Group Authoring

Software that allows several individuals to collaborate and share the responsibility of writing and editing a document or report.

Group Decision Support Systems (GDSS)

Interactive computer-based system designed especially to support the decision process, especially in meetings. These systems typically support aspects of the decision process such as brainstorming, idea organization, evaluation, prioritization, and voting.

Group Scheduling & Calendaring

Software which supports personnel and facilities event scheduling. Also, meeting management support, including meeting facilitation, and support for virtual, remote, or distributed meetings.

Groupware

A set of computer software applications which allows two or more people to work together. Generally includes such functions as group brainstorming, voting, and discussion.

Knowledge Management

Capturing, distributing and managing organizational knowledge by creating a repository for both structured and unstructured facts and opinions from throughout the organization and its environment.

One-way Bulletin Boards (BBS)

System which allows posting of information for other individuals to access.

Personal Communication Tools

Portable communication devices such as portable computers (laptops, notebooks, palm held, etc.,) with remote dialup capabilities, wireless phones, pagers, fax devices, etc.

Project Management

Software that automates workforce management and project coordination, including distributed project management, support for mobile working, sales force automation; for example, Microsoft Project software.

Remote Dial-Up Access

Using a PC or a laptop to dial into the organization's main computer system from a distant location in order to send and retrieve information.

Web Browser

Software which is used for viewing web pages and multimedia content, downloading applications and documents as well as providing information in web forms and uploading documents to a web server (e.g., Netscape's Navigator or Microsoft's Internet Explorer).

Work Flow Management System

Allows documents to be routed through organizations using a structured process. Workflow systems may provide features such as routing, development of forms, and support for differing roles and privileges. A simple example of a workflow application is an expense report in an organization, which an employee enters and then submits electronically. A copy is archived and routed to the employee's manager for approval. The manager receives the document, electronically approves it and sends it on for payment and archival.

Virtual Teams (VT)

Virtual Teams (VTs) are groups of people who work closely together for a shared objective even though they are usually geographically separated by large distances. Their primary interactions are through a combination of collaborative technologies instead of face to face meetings.

Collaborative Work Group Technology Survey

Please complete the survey by writing the answers or placing a check mark in the circles where appropriate.

I. Demographic Information

1. a) Name of your parent company: _____

b) Industry: Check ONLY one circle

- ① Communications ② Computing Technology ③ Consulting
④ Finance/Accounting ⑤ Government ⑥ Healthcare
⑦ Oil and Gas ⑧ Manufacturing ⑨ Service/Retail
⑩ Other: _____

c) Your level in the company: Check ONLY one circle

- ① CEO ② VP/CIO ③ Director/Manager ④ Supervisor ⑤ Other _____

d) Which of the following categories of responsibility best describe your job? Check ONLY one circle

- ① Information Technology Development/Support
② Collaborative Work Group Technology Support
③ Collaborative Work Group Member
④ Other: _____

e) Your age: (optional) _____

f) Sex: (optional) ① Male ② Female

2. Your Organizational Unit

In this survey you will be asked to provide knowledge about your organization's use of collaborative work groups and support technology. If you are with a large company, you may not be able to accurately answer for the whole company. You may be a part of a smaller company or division within your parent organization, and may only be able to answer accurately for this smaller component, as opposed to the larger organization. Therefore, please respond to the rest of this section at the level (i.e., company or unit) at which you have the most knowledge of collaborative work groups in your company.

a) You will base all of your responses for the rest of Sections I and II on: Check ONLY one circle

- ① your parent company ② your organizational unit

b) If you are not answering for your parent company, please fill in the name of the largest organizational unit for which you are responding:

c) Number of employees in company or organizational unit:

- ① Under 250 ② 250 - 1000 ③ 1000 - 5000
④ 5000 - 25,000 ⑤ 25,000 - 100,000 ⑥ 100,000 - 200,000 ⑦ 200,000 or more

3. Does your organization use collaborative work groups? ① Yes **Continue** ② No **Please Stop Here and Return Survey**
- a) Which types of work groups are used in your organization? **Please check all that apply.**
- ① **Work Groups/Teams:** Produce goods or services for internal and external customers
 - ② **Management Groups/Teams:** Coordinate the management of a number of other work groups
 - ③ **Project Groups/Teams:** Complete a specific project, then usually disband upon completion
 - ④ **Virtual Groups/Teams:** Work groups that must collaborate using technology due to limited ability to meet face-to-face
- b) Approximately how many of these groups would you say your organization has, overall?
- ① 1 - 4 ② 5 - 10 ③ 11 - 20 ④ 20 - 40 ⑤ 40 or more
- c) How long has your organization used collaborative work groups?
- ① Under 1 year ② 1 - 2 years ③ 2 - 5 years ④ 5 - 10 years ⑤ 10 years or more
- d) At what stage of development or maturity are **MOST** of your collaborative work groups operating?
- Please check ONLY one.**
- ① **Forming:** The group is newly-formed; norms have not yet been established.
 - ② **Storming:** The group is frustrated and angry over differences between individual and group desires.
 - ③ **Norming:** The members understand their roles, have shared norms, and are learning to work together.
 - ④ **Performing:** The group understands the tasks and purpose, and performs as a team.
 - ⑤ **Adjourning:** The group delivers results, provides support, wraps up details, and celebrates its endings.

II. Company/Organizational Unit's Use of Technology-Supported Collaborative Work Groups

Please complete this section at the level (i.e., company or organizational unit) at which you have the most knowledge of how your company or organizational unit uses technology-supported collaborative work groups.

4. Do any of these collaborative work groups have to work with supportive technological tools because they have limited face-to-face contact (e.g., virtual teams)? ① Yes **Continue** ② No **Please Stop Here and Return Survey**
- a) How many of these technology-supported work groups would you say your organization has, overall?
- ① 1 - 4 ② 5 - 10 ③ 11 - 20 ④ 20 - 40 ⑤ 40 or more
- b) Approximately how many years has your organization used work groups that use technology to collaborate?
- ① Under 1 year ② 1 - 2 years ③ 2 - 5 years ④ 5 - 10 years ⑤ 10 years or more
- c) What is the approximate number of people on these technology-supported work groups? **Please fill in amounts**
- Minimum: Maximum: Average:
- d) Where are the members of these technology-supported work groups located?
- ① In the same country ② Multinational ③ Both
5. Do these work groups use technology to collaborate with any members from outside your organization (e.g., contractors, suppliers)? ① Yes **Continue** ② No **Go to question 8**
- a) Please place a check mark beside all the members from outside your organization that are part of these work groups:
- ① Contractors for outsource work ② Suppliers ③ Customers ④ Other: _____

6. How **effective** are these technology-supported work groups at:

- a) Communication, e.g., giving feedback, sharing info. ① *Not effective* ② *Somewhat effective* ③ *Effective* ④ *Very effective*
- b) Planning tasks & setting goals ① *Not effective* ② *Somewhat effective* ③ *Effective* ④ *Very effective*
- c) Solving problems & making decisions ① *Not effective* ② *Somewhat effective* ③ *Effective* ④ *Very effective*
- d) Resolving conflict ① *Not effective* ② *Somewhat effective* ③ *Effective* ④ *Very effective*
- e) Responding to customer requirements ① *Not effective* ② *Somewhat effective* ③ *Effective* ④ *Very effective*

7. Please fill in the circle which best describes how **important** each factor is in increasing the overall **effectiveness** of **technology-supported work groups** in your organization?

	Not Important ①	Somewhat Important ②	Important ③	Very Important ④
a) Training in how to work as a group				
b) Training in how to use collaborative technology tools				
c) Understanding cultural differences among group members				
d) Ease of use of collaborative tools				
e) Availability and quality of technical support				
f) Having a standard set of usable collaborative tools				
g) Technology infrastructure				
h) Face-to-face (same time/same place) kick-off event				
i) Same time/different place (NOT face-to-face) kick-off event				
j) Face-to-face (same time/same place) regularly scheduled group meetings				
k) Planning and holding effective work group meetings				
l) Communicating effectively without being face-to-face				
m) Problem-solving and making decisions in a work group				
n) Planning and managing task completion in a work group				
o) Setting well-defined goals and assessing performance in a work group				
p) Group facilitation and/or leadership				
q) Level of trust among group members				

III. Your Involvement in Technology-Supported Collaborative Work Groups

Please complete the following based on **your personal experiences** using technology tools in collaborative work groups.

8. Are **you** a member of one or more of these work groups that use technology to collaborate?

- ① Yes **Continue** ② No **Go to question 13**

a) How many?

b) What is the approximate number of people on these work groups?

Minimum: Maximum: Average:

9. How long have you been working as a member of a work group that uses computer-based technology to collaborate?

- ① Under 1 year ② 1 - 2 years ③ 2 - 5 years ④ 5 - 10 years ⑤ 10 years or more

10. Where are your collaborative work group members located?

- ① In the same country ② Multinational ③ Both

11. Do your collaborative work groups include any members from outside your organization (e.g., contractors, suppliers)?

- ① Yes **Continue** ② No **Go to question 12**

a) Please place a check mark beside all the members from outside your organization that are part of these work groups:

- ① Contractors for outsource work ② Suppliers ③ Customers ④ Other: _____

12. How **effective** are **your** technology-supported work groups at:

- | | | | | |
|--|-----------------|----------------------|-------------|------------------|
| a) Communication, e.g., giving feedback, sharing info. | ① Not effective | ② Somewhat effective | ③ Effective | ④ Very effective |
| b) Planning tasks & setting goals | ① Not effective | ② Somewhat effective | ③ Effective | ④ Very effective |
| c) Solving problems & making decisions | ① Not effective | ② Somewhat effective | ③ Effective | ④ Very effective |
| d) Resolving conflict | ① Not effective | ② Somewhat effective | ③ Effective | ④ Very effective |
| e) Responding to customer requirements | ① Not effective | ② Somewhat effective | ③ Effective | ④ Very effective |

13. Do you receive training in **how to work effectively as a collaborative work group?**

- ① Yes **Continue** ② No **Go to question 14**

a) Please do **two** things: 1. Check the circles on the left that describe the purpose of this training and 2. Check the circles on the right whether or not this training was required (i.e., yes or no).

REQUIRED?

- | | | |
|--|-----------------------------|----------------------------|
| <input type="checkbox"/> ① <i>How to use the technology infrastructure</i> | <input type="radio"/> ① Yes | <input type="radio"/> ② No |
| <input type="checkbox"/> ② <i>How to use technology tools (e.g., E-mail, document management)</i> | <input type="radio"/> ① Yes | <input type="radio"/> ② No |
| <input type="checkbox"/> ③ <i>How to effectively use technology tools in collaborative work groups (e.g., protocols on video-conferencing)</i> | <input type="radio"/> ① Yes | <input type="radio"/> ② No |
| <input type="checkbox"/> ④ <i>How to communicate member/group support without being face-to-face</i> | <input type="radio"/> ① Yes | <input type="radio"/> ② No |
| <input type="checkbox"/> ⑤ <i>How to collaborate effectively in a work group (e.g., managing conflict, understanding each other, generating new ideas)</i> | <input type="radio"/> ① Yes | <input type="radio"/> ② No |
| <input type="checkbox"/> ⑥ <i>How to problem-solve or make decisions in a work group</i> | <input type="radio"/> ① Yes | <input type="radio"/> ② No |
| <input type="checkbox"/> ⑦ <i>How to plan and hold work group meetings</i> | <input type="radio"/> ① Yes | <input type="radio"/> ② No |
| <input type="checkbox"/> ⑧ <i>How to plan and manage task completion in a work group</i> | <input type="radio"/> ① Yes | <input type="radio"/> ② No |
| <input type="checkbox"/> ⑨ <i>How to set goals and assess performance in a work group</i> | <input type="radio"/> ① Yes | <input type="radio"/> ② No |
| <input type="checkbox"/> ⑩ <i>Other: _____</i> | <input type="radio"/> ① Yes | <input type="radio"/> ② No |

b) How **effective** is the training you received in helping you to:

- 1) Use technology effectively? ① *Not effective* ② *Somewhat effective* ③ *Effective* ④ *Very effective*
- 2) Work effectively as a collaborative work group? ① *Not effective* ② *Somewhat effective* ③ *Effective* ④ *Very effective*

c) Please indicate which *methods* are used to deliver this training:

- ① *Computer-based training (CBT)* ② *One-on-one training* ③ *Classroom training*
 ④ *Demonstrations* ⑤ *Other: _____*

d) How long does the training last?

- ① *4 hours or less* ② *1-2 days* ③ *3-5 days* ④ *More than 5 days*

14. Has the use of collaborative technologies affected the attitudes or performance of individuals or work groups? ① Yes **Continue** ② No **Go to question 15**

a) If yes, please check circles that best describe those changes:

- | | |
|---|---|
| <input type="checkbox"/> ① <i>Sense of ownership & commitment</i> | <input type="checkbox"/> ② <i>Less job stress</i> |
| <input type="checkbox"/> ③ <i>More job satisfaction</i> | <input type="checkbox"/> ④ <i>Greater job stress</i> |
| <input type="checkbox"/> ⑤ <i>Decreased Absenteeism/Turnover</i> | <input type="checkbox"/> ⑥ <i>Longer Work Days/Hours (24-hr. job)</i> |
| <input type="checkbox"/> ⑦ <i>Improved work performance</i> | <input type="checkbox"/> ⑧ <i>Increased morale</i> |
| <input type="checkbox"/> ⑨ <i>Other: _____</i> | |

IV. Collaborative Work Technologies and Activities

15. For each of the following collaborative technology tools, please check the collaborative work activities that they best support. * See the first row of the table for an example.

Collaborative Work Activity	1) Meeting Planning/Mgmt. (e.g., scheduling, agenda development, meeting facilitation)	2) Sharing Information/Data	3) Creative Idea Generation (e.g., brainstorming)	4) Collaborative Problem-Solving & Decision-Making	5) Planning and Task Coordination	6) Conflict Resolution	7) Goal Setting	8) Performance Monitoring & Evaluation	9) Communication for member/group support (e.g., team / trust-building, coaching)	10) Group Leadership
Collaborative Tool	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
EXAMPLE: E-mail	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
a) E-mail/ Electronic Messaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Audio Conferencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Conference Room Video Conferencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Desktop Videoconference	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Group Scheduling & Calendaring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Electronic Whiteboarding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Collaborative Presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Document Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Electronic Group Authoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) Project Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k) Knowledge Mgmt. (e.g., expert systems, info filters)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l) Discussion Databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m) One-way Bulletin Boards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n) Work Flow Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o) Web Browser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
p) Personal Communication Tools (e.g., Cell phones, laptops)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
q) Remote Dial-up Access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
r) Group Decision Support Systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Please base your responses to all questions on the largest organizational unit for which you are comfortable responding.

V. Collaborative Work Group Tools

16. For each collaborative tool, please answer the questions across the top of the table. Please, circle responses in columns 1, 2, 3, 5, 7, 9 and write-in your responses in columns 4, 6 and 8.*

For this Collaborative Tool:	1) Do you use an external network? Yes (Y) No (N)	2) Frequency of use: D = daily W = weekly M = monthly Y = yearly (Circle)	3) Is training required? Yes (Y) No (N)	4) How long has your organization used it? (Months)	5) How successful is this tool? 1 = very unsuccessful 2 = unsuccessful 3 = successful 4 = very successful DK = don't know	6) Approx. % of employees currently using this tool:	7) Do you access this application through a web-based interface? Yes (Y) No (N)	8) We use these technologies: (e.g. Lotus Notes, Microsoft Exchange, Novell's GroupWise, etc.) List ALL you use.	9) Is there a corporate standard set of tools? Yes (Y) No (N)	10) Approx. % of employees that will be using it in 2 years:
EXAMPLE: E-mail	<input checked="" type="radio"/> Y / <input type="radio"/> N	<input checked="" type="radio"/> D / <input type="radio"/> W / <input type="radio"/> M / <input type="radio"/> Y	<input checked="" type="radio"/> Y / <input type="radio"/> N	60 Mos.	1 2 3 <input checked="" type="radio"/> 4 DK	80 %	<input checked="" type="radio"/> Y / <input type="radio"/> N	LOTUS NOTES	<input checked="" type="radio"/> Y / <input type="radio"/> N	100 %
a) E-mail/Electronic Messaging	<input type="radio"/> Y / <input type="radio"/> N	D / W / M / Y	<input type="radio"/> Y / <input type="radio"/> N	Mos.	1 2 3 4 DK	%	<input type="radio"/> Y / <input type="radio"/> N		<input type="radio"/> Y / <input type="radio"/> N	%
b) Audio Conferencing	<input type="radio"/> Y / <input type="radio"/> N	D / W / M / Y	<input type="radio"/> Y / <input type="radio"/> N	Mos.	1 2 3 4 DK	%	<input type="radio"/> Y / <input type="radio"/> N		<input type="radio"/> Y / <input type="radio"/> N	%
c) Conference Room Video Conferencing	<input type="radio"/> Y / <input type="radio"/> N	D / W / M / Y	<input type="radio"/> Y / <input type="radio"/> N	Mos.	1 2 3 4 DK	%	<input type="radio"/> Y / <input type="radio"/> N		<input type="radio"/> Y / <input type="radio"/> N	%
d) Desktop Videoconference	<input type="radio"/> Y / <input type="radio"/> N	D / W / M / Y	<input type="radio"/> Y / <input type="radio"/> N	Mos.	1 2 3 4 DK	%	<input type="radio"/> Y / <input type="radio"/> N		<input type="radio"/> Y / <input type="radio"/> N	%
e) Group Scheduling & Calendaring	<input type="radio"/> Y / <input type="radio"/> N	D / W / M / Y	<input type="radio"/> Y / <input type="radio"/> N	Mos.	1 2 3 4 DK	%	<input type="radio"/> Y / <input type="radio"/> N		<input type="radio"/> Y / <input type="radio"/> N	%
f) Electronic Whiteboarding	<input type="radio"/> Y / <input type="radio"/> N	D / W / M / Y	<input type="radio"/> Y / <input type="radio"/> N	Mos.	1 2 3 4 DK	%	<input type="radio"/> Y / <input type="radio"/> N		<input type="radio"/> Y / <input type="radio"/> N	%
g) Collaborative Presentation	<input type="radio"/> Y / <input type="radio"/> N	D / W / M / Y	<input type="radio"/> Y / <input type="radio"/> N	Mos.	1 2 3 4 DK	%	<input type="radio"/> Y / <input type="radio"/> N		<input type="radio"/> Y / <input type="radio"/> N	%
h) Document Management	<input type="radio"/> Y / <input type="radio"/> N	D / W / M / Y	<input type="radio"/> Y / <input type="radio"/> N	Mos.	1 2 3 4 DK	%	<input type="radio"/> Y / <input type="radio"/> N		<input type="radio"/> Y / <input type="radio"/> N	%

* Please base your responses to all questions on the largest organizational unit for which you are comfortable responding.

16. **Collaborative Work Group Tools, continued**

For each collaborative tool, please answer the questions across the top of the table. Please, circle responses in columns 1, 2, 3, 5, 7, 9 and write-in your responses in columns 4, 6 and 8.*

For this Collaborative Tool:	1) Do you use an external network? Yes (Y) No (N)	2) Frequency of use: D = daily W = weekly M = monthly Y = yearly (Circle)	3) Is training required? Yes (Y) No (N)	4) How long has your organization used it? (Months)	5) How successful is this tool? 1 = Very unsuccessful 2 = unsuccessful 3 = successful 4 = Very successful DK = don't know	6) Approx. % of employees currently using this tool:	7) Do you access this application through a web-based interface? Yes (Y) No (N)	8) We use these technologies: (e.g., Lotus Notes, Microsoft Exchange, Novell's GroupWise, etc.) List ALL you use.	9) Is there a corporate standard set of tools? Yes (Y) No (N)	10) Approx. % of employees that will be using it in 2 years:
j) Group Authoring	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%
l) Project Management	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%
k) Knowledge Mgmt. (e.g., expert systems, fillers)	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%
i) Discussion Databases	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%
m) One-way Bulletin Boards	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%
n) Work Flow Management	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%
o) Web Browser	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%
p) Personal Communication Tools (e.g., Cell phones, laptops)	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%
q) Remote Dial-Up Access	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%
r) Group Decision Support Systems	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%
s) Other	Y/N	D/W/M/Y	Y/N	Mos.	1 2 3 4 DK	%	Y/N		Y/N	%

* Please base your responses to all questions on the largest organizational unit for which you are comfortable responding.

VI. Collaborative Technology Management and Support

Please respond to this section at the level (i.e., company or organizational unit) at which you have the most knowledge of collaborative technology management and support.

17. Please check the circle which best describes how **important** each factor is to the **successful implementation** of **collaborative work group technology** in your organization?

Not Important ①	Somewhat Important ②	Important ③	Very Important ④	
a) Involving the users in the design and implementation of collaborative technology	①	②	③	④
b) Communicating the strategy for collaborative technology implementation to users	①	②	③	④
c) Training in how to work as a group	①	②	③	④
d) Training in how to use collaborative technology tools	①	②	③	④
e) Allowing employees adequate time to learn new skills	①	②	③	④
f) Having a standard set of usable collaborative tools	①	②	③	④
g) Availability and quality of technology support	①	②	③	④
h) Technology infrastructure	①	②	③	④
i) Policies and procedures which support collaborative work	①	②	③	④
j) Policies and procedures which support technology use	①	②	③	④
k) Policies and procedures which support the integration of collaborative work and technology	①	②	③	④
l) Organization restructured to perform collaborative work	①	②	③	④
m) Supportive organizational climate	①	②	③	④

18. Has your organization made changes in the systems that support collaborative technologies in work groups?

- Yes Continue No Go to question 19

a) Please check all that describe the changes your organization has made:

- ① Assessing collaborative work group performance
- ② Rewarding collaborative work group performance
- ③ Developing lateral paths of career progression (e.g., group-to-group or job-to-job within a team)
- ④ HR policies and practices (e.g., training in technology and collaboration)
- ⑤ New roles for IT functions (e.g., from IT expert to cross-functional collaborator)
- ⑥ Organization restructured to promote collaborative work across time and distance (e.g., network organization)
- ⑦ New roles for senior managers (e.g., becoming part of a technology-based collaborative work group)
- ⑧ Connecting customers and/or suppliers to your organization with collaborative technologies
- ⑨ Other: _____

19. Please share with us what your organization or organizational unit has done to increase the effective use of technology in collaborative work groups.

- a) Technical Implementation: _____

- b) Increasing user understanding and acceptance: _____

- c) Other: _____

20. How effective is your organization at:

- a) **Implementing** technology supported work groups?
① Not effective ② Somewhat effective ③ Effective ④ Very effective
- b) **Developing systems** to support the continued use of technology supported work groups?
① Not effective ② Somewhat effective ③ Effective ④ Very effective

21. Is there a designated collaborative work group technology coordinator or manager in your organization?

- ① Yes **Continue** ② No **Go to question 22**

- a) What is their title? _____
- b) To whom (i.e., position/title) or where in the organization does this person report? **Check ONLY one circle**
① CEO ② VP/CIO ③ Director/Manager ④ Supervisor ⑤ Other: _____

22. a) To what extent is your organization committed to investing in the use of collaborative tools? **Check ALL that apply**

- ① Not Committed ② Committed ③ Separate Budget Item

b) To what extent is your organization committed to providing support for using these collaborative tools?

Check ALL that apply

- ① Not Committed ② Committed ③ Separate Budget Item

VII. Future Use of Collaborative Technologies

23. a) What collaborative technology tools do you plan to acquire in the next 2-3 years and why?

b) Are there any collaborative technology tools you plan to drop in the near future and why?

Thank you very much for your time and assistance!

Please return the survey in the enclosed envelope to:

**Collaborative Work Group Technology Survey Team
Center for the Study of Work Teams
University of North Texas
P.O. Box 311280
Denton, TX 76203-1280**

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