Virtual teaming: a strategy for moving your organization into the new millennium

Stanley Stough
Southeast Missouri State University, Cape Girardeau, Missouri, USA
Sean Eom
Southeast Missouri State University, Cape Girardeau, Missouri, USA
James Buckenmyer
Southeast Missouri State University, Cape Girardeau, Missouri, USA

Abstract
The concept of teams and
teamwork is increasingly
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workplace. This paper looks at the
concept of teams and teamwork
and several innovative ways of
using teams. Among the
innovative ways of using teams
are globally networked teams,
team-based strategic planning,
flexible-jobbing, the horizontal
corporation, and the virtual
corporation. The use of computer-
mediated communication
technologies and other groupware
technologies provide a workable,
reliable, and flexible base of
systems for creating the platforms
for virtual teams and virtual
organizations. An overview of
current information technology
available for supporting teams and
which types of information
technology are most valuable in
enhancing the new team
applications is briefly addressed.
Supporting technologies include
groupware for facilitating
communication, supporting
information storage and retrieval,
and supporting decision making.
Lastly, the many competitive
advantages to the use of virtual
teaming in the global environment
as well as its managerial
implications and strategic
recommendations for improving
the performance of virtual teams
are presented.

Introduction

The concept of teams and teamwork is increasingly becoming an important key to productivity and employee satisfaction in the contemporary workplace. The use of teams has increased significantly as organizations (both public and private) have turned more and more jobs over to team-based structures. Teams are now being used in innovative ways in strategic planning, flexible-jobbing initiatives, global networks, the horizontal organization, and the virtual organization. In addition, of course, teams can be employed in traditional decision-making techniques such as brainstorming, nominal group, and Delphi.

A key to success with modern teams involves the continual use of information technology to support team activities such as setting clear goals, coordinating and negotiating with others, planning and managing work processes, gaining decision-making skills, and aiding management skills like budgeting and scheduling. Many types of groupware (information systems that make it possible for a group of collaborating individuals to carry out computer-supported cooperative work) can now substantially aid team processes. There is groupware available to facilitate communication, support information retrieval, and support decision making. This technology definitely helps group members properly develop and maintain high-performance teams.

This paper looks at the concept of teams and teamwork and several innovative ways of using teams. It then looks at current information technology available for supporting teams and which types are most valuable in enhancing the new team applications. Last, the competitive advantages to using virtual teaming in the global environment together with managerial implications and strategic recommendations for improving performance of teams are addressed.

The importance of teams

It is virtually impossible to avoid being a member of a team today. Whether you are a manager, a homemaker, a subordinate, or a student, it is almost impossible to avoid being a member of a team (Whetten and Cameron, 1998). A 1993 survey of 1,293 US-based organizations by the American Society for Quality Control (ASQC) and the Gallup Organization found that over 80 percent of respondents reported some form of work-team activity (primarily problem-solving teams). Two-thirds of full-time employees indicated that they participated in teams and 84 percent participated in more than one team (ASQC, 1993).

Many organizations have directly attributed improvements in performance to the establishment of teams in the workplace (Wellins *et al.*, 1991). For example, by using teams Westinghouse Furniture Systems increased productivity 74 percent in three years, Federal Express cut service errors by 13 percent, Volvo's Kalamar facility reduced defects by 90 percent, and Dana Corporation's Minneapolis valve plant trimmed customer lead time from six months to six weeks.

In 1992, Lawler, Mohrman, and Ledford conducted a comprehensive survey among *Fortune 500* companies concerning employee involvement in teams. They concluded that employee involvement in teams had a strong positive relationship with several dimensions of organizational effectiveness (e.g. improved management decision making, increased employee trust in management, improved implementation of technology) and worker effectiveness (e.g. improved customer service, improved quality of products and services, lower absenteeism and turnover).

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Teams have definitely become important in organizations because, increasingly, data shows that productivity, quality, and morale improves when teams are utilized. There are many reasons for these positive outcomes but the Maier (1967) study provides a classic listing of benefits. Among these benefits are:
- Teams produce a greater quantity of ideas and information than individuals acting alone.
- Teams improve understanding and acceptance among individuals involved in the process.
- Teams create higher motivation and performance levels than individuals acting alone.
- Teams offset personal biases and blind spots that hinder the decision process.
- Teams sponsor more innovative and risk-taking decision making.

Peters (1987) stated that as far as he could determine, there are no limits to the use of teams! He believes the:

> ... power of the team is so great that it is often wise to violate apparent common sense and force a team structure on almost anything.

Developing teams and teamwork will continue to be a major thrust for all organizations over a future planning horizon. Learning how to foster effective team processes, team roles, team leadership, and good relationships among team members (as well as with management, clients, and suppliers) will continue to be a major organizational management topic for some time.

Innovative ways of better using teams

Many innovative ways of better using teams are being practiced today. Among the innovative ways teams are being presently used to achieve high performance are:
- global networks/teams;
- team-based strategic planning;
- flexible-jobbing;
- the horizontal corporation; and
- the virtual corporation.

In addition, other traditional techniques such as brainstorming, nominal group technique, or Delphi technique can be enhanced by information technology.

Global networks/teams
In an attempt to encourage employees from different countries and product areas to communicate and help global learning, many international-based organizations are constantly moving their managers from one foreign subsidiary to another to help them develop a global view. This practice helps expatriate managers build a network of contacts throughout the world that they can use to increase global integration. If a specific problem arises, a manager with a global network can contact a colleague in Malaysia or Belgium to help find a solution.

Groups of managers from foreign subsidiaries can practice the same to develop a global perspective. Global learning and the integration of global organizations occurs through the process of teams going from one subsidiary to another. Team members act as consultants and transfer new ideas and innovations to foreign subsidiaries. At the same time, team members learn new foreign techniques and innovations they can bring to the home country.

Ford Motor Company, for example, has a global design network that ties managers/employees together world-wide. Other frequent users that have augmented the traditional organization chart with global networks have been Unilever (e.g. utilized a team of Chinese-speaking troubleshooters to help with expansion problems in China) and Texas Instruments (e.g. utilized a 200-member team of professionals called "nomads" to set up chip-manufacturing plants in four different countries in four years) (George and Jones, 1996, p. 599)

Team-based strategic planning
Strategic planning in the 1960s, 1970s, and even the 1980s, tended to consist of a cheif executive officer (CEO) and the planning officer of an organization getting together to devise a plan and then handing it to operating people for implementation.

The advent of the global business environment has caused major changes in who does the planning, how it is done, and the content of the plan. It is common to find teams of line and staff managers with a wide range of ages and cultural backgrounds involved in the strategic planning process today. Often these internal teams are supplemented with external members including customers and suppliers. The process is also much less structured and produces much shorter documents than in the past. It is becoming accepted that a good strategic planning process must allow ideas to surface from anywhere and at any time. The contents of the plans are much more concerned with issues, strategies, and implementation than in the past. Certainly this is an innovative way to better use teams in organizations and is directly enhanced by advocates in information technology.

Flexible-jobbing

The employment creators of the past – mass production and large organizations – are disappearing. Technology enables organizations to replace fixed jobs with tasks performed by evolving teams (Ball and McMcCulloch, 1999). In other words, new communication and computer technologies are creating flexible jobbing in the workplace; changing the traditional, fixed-jobs approach into one in which teams perform tasks and the composition of these teams changes as the tasks evolve.

The modern organization is being transformed from a structure built of jobs into a field of work that needs to be done. An organization such as Intel, for example, will hire an individual to be a member of a specific project team (Ball and McMcCulloch, 1999). The project will change with time and the individual's duties and responsibilities change with it. The individual may be assigned to a second project before the first is finished and then possibly even to a third. As projects evolve and change, the individual will work with several teams and team leaders simultaneously (possibly in different locations). This innovative way to use teams is very significant because it causes the traditional organization hierarchy to implode. Individuals no longer take directions from a job description or a supervisor. Signals now come from the changing demands of the project and the team.

Horizontal corporations

This innovative form of organization is characterized by lateral decision processes, horizontal networks, and a strong corporate culture (Ball and McMcCulloch, 1999). The concept is currently being used by large global firms who have an electronics/computer-based orientation (e.g. AT&T, General Electric, and Dupont). In this organization form, teams are drawn from across different departments to solve a problem or deliver a product.

This organization is often called an "antiorganization" or "boundaryless" organization because it seeks to eliminate the constructs imposed by a traditional organization structure and replace it with departments with empowered teams. In this organization, teams worldwide create and market an organization's products through a carefully developed system of team relationships. The lateral relationships incite innovation and continuous product development. Such an approach definitely places greater decision-making responsibility in the hands of teams and lower-level management.

Virtual corporations

A virtual or networked corporation is an organization that coordinates economic activity to deliver value to customers using resources outside the traditional boundaries of the organization (*Financial Times*, June, 1997). It relies on third parties to conduct its business. Outsourcing, once used for downsizing or cost reduction, is now being used to obtain teams with specialized expertise to complete a total product. To provide maximum flexibility and obtain the best teams, the selection process often covers a wide geographic area which makes the use of electronic technology a necessity.

Today's global markets have fostered the virtual organization because companies must move fast to take advantage of opportunities and bring human resources together more quickly than if they all had to be assembled in a single location. Since companies often lack expertise or resources in all areas, the virtual organization (and virtual teams) are formed. Virtual organizations are usually a temporary group of independent companies formed to exploit a specific opportunity. They may be suppliers, manufacturers, marketers, customers, and even competitors. Each member provides a team to contribute specific expertise. There is no central office or hierarchy. Virtual corporations are based on electronic linkages among companies and individuals otherwise separated by great distances. Once the job is finished, the group and its teams will generally disband. Examples of firms using the concepts of virtual corporations include Nokia, Nike, Reebok, Intersolve Group, and Apple Computer.

Traditional techniques utilized and enhanced by electronic means

There are several traditional techniques often used to improve group decision making – brainstorming, nominal group and Delphi techniques – where electronic means can either enhance or broaden the scope of the utilization.

Brainstorming is a group decision-making technique in which participants contribute ideas in a totally open and free format without criticizing one another (Schermerhorn, *et al.*, 1994). This technique is highly applicable to the use of computer-based conferencing systems and e-mail applications.

The nominal group technique uses structured rules for minimizing interactions to facilitate decisions on controversial subjects (Schermerhorn, *et al.*, 1994). Since this process relies heavily on independent individualized work, it is particularly adaptable to such electronic tools as e-mail and electronic groupware. The utilization of electronic techniques could easily enhance this approach and may also broaden the range and scope of its applicability.

The Delphi technique was designed by The Rand Corporation as a group decision tools for situations in which geographically dispersed participants are given a series of questionnaires to help them reach a decision (Schermerhorn, *et al.*, 1994). Again it should be obvious how this technique can be utilized with electronic communication. It is important to note that electronic communication could significantly increase the speed of decisions reached through the Delphi technique.

These traditional techniques might be particularly applicable to virtual or global operations where face to face meetings are restricted. They might also be extremely beneficial where, because of time or place limitations, teleconferencing or other group approaches might be difficult to arrange. Using these techniques may make it possible to include valuable inputs from individuals who might not otherwise be available.

It is evident that all of the above represents innovative ways of better using teams. A small number of employees can be leveraged into thousands of highly trained experts in design, production, marketing, and so forth. The evolution of the technology infrastructure has made possible vast changes in the workforce and working methods, such as teleworking, home offices, flexible working practices, and teams. All of these, in turn, have contributed to an increase in all the innovative team applications discussed above. What other forms of information technology are available for supporting teamwork? The next section of this paper addresses that topic.

Information technology for supporting teamwork

Teams share authority, responsibility, leadership, decision making, results, and rewards. Effective management of teamwork, therefore, requires each member of the team to perform the following activities effectively.
- Setting clear, measurable goals.
- Coordinating and negotiating with others to get the work done – planning and managing work process and scheduling.
- Gaining decision-making skills to make team decisions and solve team problems.
- Gaining management skills such as budgeting, priority setting, scheduling, ordering and purchasing supplies, record keeping, appraisals of teams performance, peer evaluations, etc.

In doing so, teams need training and education. Furthermore, to gain a competitive edge, it is imperative for teams to be able to harness a specific type of information technology for supporting teams and groups (groupware). We briefly introduce a plethora of groupware and their potential applications.

With the advent and advancement of data communication, a major trend in the computer-based information systems (CBIS) area today is the use of information systems technology to help a group of collaborating individuals and entire organizations across time and space. Groupware is a generic term for information systems that make it possible for a group of collaborating individuals to carry out cooperative activities such as designing products, writing project reports, making group decisions, etc. These cooperative activities are often termed computer-supported cooperative work (CSCW).

Groupware for facilitating communication
Electronic-mail (e-mail)
This is the most pervasive and successful form of person-to-person groupware. Anyone who has an e-mail address can send electronic mail to anyone with an e-mail address on any computer in the world connected to a computer network. E-mail capability has also become an essential element in many commercial groupware products.

Computer-based conferencing systems
These allow a workgroup to exchange views, ideas, or information in a discussion to overcome the barriers created by time and space. Many types of computer-based conferencing systems exist today including computer conferencing (e-mail meeting), desktop conferencing, teleconferencing, video conferencing, and multimedia conferencing.

Collaborative writing/programming/drawing
This is an activity of creating documents by a group of collaborative workers. Collaborative writing systems permit each member of

workgroups to create and edit his or her sections of any document type including text, graphics, spreadsheets, and so on.

All of these groupware systems for facilitating communication enhance the innovative use of teams. Imagine how tools such as e-mail, computer-based conferencing, and collaborative writing systems can increase both the performance efficiency and effectiveness of team-based strategic planning, virtual teams, and the traditional group decision techniques.

Groupware for supporting information storage and retrieval
Workgroup database management systems
Information storage and retrieval are one of the fundamental operations of CBIS. A database management system (DBMS) is a computer software for managing (entering, updating, organizing, querying, producing reports, etc.) databases. DBMS such as Microsoft Access, Microsoft FoxBase, dBase, etc. can be used for a single user as well as multiple users. The difference between workgroup DBMS and individual DBMS is that the former must support controlled sharing of data.

Workflow automation systems
CSCW technology such as e-mail with the attachment function can be used to facilitate smooth flow of paperwork in many offices. Workflow automation applications include any type of office transaction activity that has to be examined, processed, and approved by several persons in an organization. For example, approving travel expense accounts is a transaction that can be processed by the work flow automation system to streamline the procedure and shorten the processing time required for the document.

Workgroup scheduling (workgroup calendaring) systems
These simplify the scheduling of daily, weekly, and long-range activities of workgroups. Using a shared database and scheduling programs, an organization can minimize personal schedule conflicts among workgroup members.

Workgroup shared textbase systems
These provide an efficient way of retrieving the non-structured text data from organizational memory. Organizational memory (or shared textbase) is a collection of text data from e-mail, electronic bulletin board, or group conferencing systems. When the memory stores the text data collected from a group activity, it is often called group memory. It is an important corporate resource that can be used in problem solving, customer support and others.

These techniques benefit all innovative team approaches. One can visualize, however, how these systems are especially valuable to flexible jobbing concepts. Workflow automation systems and workgroup scheduling systems have direct applications for enhancing teams in performing tasks which were previously accomplished through a fixed jobs approach.

Groupware for supporting decision making
Group decision support systems (GDSS)
Since the 1980s, much attention has been given to the area of GDSS. A GDSS is:

> ... an interactive computer-based system which facilitates solution of unstructured problems by a set of decision makers working together as a group (DeSanctis and Gallupe, 1985).

Supporting group decision making requires special additional hardware, software, people, data and procedures. Each member of the group has a PC/workstation which is linked to the PCs of other group members and to one or more large public viewing screens, so that each member can see the inputs of other members. GDSS software must have special functional capabilities such as anonymous inputs of the user's ideas and comments, listing group members' inputs, voting and ranking decision alternatives and displaying them. The people components of GDSS should include a group facilitator who leads the session by serving as the interface between the group and the computer systems.

Group support systems (GSS) and electronic meeting systems
During the early 1990s, the concept of GSS has emerged to present a more encompassing view of supporting decision and communication needs of the workgroup. A GSS is defined as a CBIS used to support intellectual collaborative work (Jessup and Valacich, 1993). This definition of GSS implies that GSS support communication, information sharing and retrieval, and decision-making activities of the workgroup. Dennis *et al.* (1988) defined electronic meeting systems as an umbrella term to include GDSS, GSS, and CSCW.

A wide range of groupware applications for supporting group decision making have been reported including strategic planning, quality improvement process and business process reengineering support, knowledge acquisition for multiple experts, distributed group decision making involving fairly large numbers of participants (tens to hundreds), expediting the requirements specification in

the system development process, and project management.

Project management groupware using graphical user interfaces allow mangers in various departments to better plan and coordinate numerous activities to be performed by many departments. Through sharing project scheduling and related information stored in the file server, this system makes every department aware of the dependency of each task on other tasks and therefore contributes the completion of the project on time. Many commercial products are available including Microsoft corporation's Team Manager 97, Lotus Notes, Microsoft exchange, and Livelink Intranet (version 8) of OpenText Corporation. These products can be used to monitor and report on the project progress data by employee, project, or time period.

Team-based strategic planning, the horizontal organization, and the virtual organization are all directly impacted by groupware for supporting decision making. This technology permits teams to collaborate closely even if separated by time, space, and organizational constraints. The virtual corporation, for example, holds the promise of being able to efficiently and effectively deal with tasks and resources through teams from totally independent companies and often across national boundaries. The use of these technologies is definitely necessary for creating the platforms for the virtual organization.

Case studies of virtual teams

Sun Microsystems can provide some examples of the utilization of virtual teams. After the company made the decision to utilize virtual teams to provide a "lean and mean" organization, they conducted a conference of a number of CEOs who had utilized teams. These meetings produced two major suggestions. The first was the importance of teamwork. The second suggested the positive potential of "getting employees directly involved in customer satisfaction" (Lipnack and Stamps, 1997). As a result, Sun Microsystems integrated teams, many of them virtual teams, into their total operations. The following examples are taken from Lipnack and Stamps (1997).

> The SunExpress' Customer Order Cycle Team developed an electronic data interchange system which allows major customers to place their orders online and receive them within three days. This was a cross-functional virtual team which included both a customer and a supplier and included representatives from four states as well as two international representatives. The virtual teams work was finished in seven months without ever having met face-to-face. The entire team was never in the same room at the same time. They did use weekly conference calls.

SunService's Live Call Transfer Team, which was based in England, had a major impact on customer response time. It entirely overhauled and simplified SunService's call answering process. Because of the necessity of retaining 24 hour, world-wide customer responses it was not possible to pull the team members from the phones. The entire process was conducted by e-mail. The team redesigned office space, telephone technology and new job descriptions. The team significantly reduced its customer response time and allowed them "to offer 24-hour global support independent of where the engineers" were located.

SunService's Two Day Customer Quality Index Team improved their customer service two day response rate from 54 percent problem resolution to 70 percent problem resolution. At the same time they cut the backlog of open customer problems by 49 percent in just nine months. Engineering team members were from five different locations on the US east and west coasts.

The Reliability Management System (RMS) Team was fairly large, 25 members, from 12 different units and three continents. The RMS team is trying to solve "how to provide integrated processes, metrics, and tools for detecting and resolving product incompatibilities once they are in the field." While these problems have not been totally solved and additional world-wide situations continue to arise, such significant progress has been made by the team that they are continuing operation into the second year.

The teams mentioned above have had spectacular success, however, a few of the team efforts at SunSystems have foundered although none was a complete disaster. Overall, the virtual team concept has been considered a resounding success. Three aspects of Sun's virtual team projects may point to success for other organizations wishing to utilize virtual teams: executive sponsorship, preparation, and infrastructure.

Managerial implications and strategic recommendations

There are many competitive advantages to the use of virtual teaming in the global environment of the new millennium. Some of the immediate advantages of virtual teaming are the following:
· Virtual teams provide for the use and development of streamlined

organizations. An organization can be in every corner of the world without being hamstrung by a corporate headquarters and corporate staff.

- Virtual teams/companies can be created with relatively small start-up costs (often with an astonishing future for growth), assuming the computer infrastructure is in place.
- The virtual teams/corporations spatial independence is what really sets it apart from highly structured teams/ competition. The freedom of the system allows the participants to work in a high rise in New York City or while ice-fishing on the Great Slave Lake, Canada.

The management implications of virtual teaming are significant, however, and an organization must be cognizant of potential problem areas. For example, when there is a reduction in the amount of formal/informal contact within the ranks of the workforce there is a potential for:

- Loss of contact with management and workers (e.g. day-to-day discussions, water-cooler philosophizing, networking, etc.).
- Loss of a culture where vision, mission, and core values of a "hero" play a significant role in success.
- Resistance to the unstructured nature of the virtual organization (e.g. off-sight, out-of-sight; out-of-sight, out-of-mind; fear of loss of control, etc.).
- Lower productivity because of an inability of people to handle the freedom of the virtual environment (e.g. lure of TV, family demands, lack of designated work space, etc.)
- Less effective oral communication skills among employees. In other words, top-notch business writing, e-mail, and telephone expertise are needed on virtual teams rather than oral communication skills.
- Lower levels of "idea transplant" in communication because one is unable to observe body language, gestures, voice tone, inflection, pitch, and other nonverbal cues.
- Miscommunication to be more prominent than ever as more importance is placed on written messages via e-mail and other forms of electronic communication. In fact, without an effective communication process for the new technology based frontier, *sharing understandable knowledge* may be the final hurdle before virtual teams become commonplace.
- Security problems as a result of data sharing, open lines of communication,

and "hacker" intervention. There is an increased necessity to protect both personal and classified files or proprietary company secrets.

- Less employee "frankness" and "honesty" in communication because of e-mail file retention and lack of privacy.
- Dissatisfaction with the reward and recognition systems for outstanding performance.

There are many strategic recommendations available for improving the performance of virtual teams. Among these recommendations are:

- Virtual teams must be recognized and rewarded for "small wins" or interim goal achievement throughout their existence and/or the evaluation period.
- The entire internal management structure must support the virtual team concept and play a strong sponsorship and facilitative role.
- Education and training concerning the use of virtual teaming must be conducted throughout the internal organization(s).
- A set of directions (mission, vision, objectives) and criteria for measuring virtual teaming effectiveness must be prepared and consistently used.
- Virtual teams must be from diverse locations, time zones, functions, companies, etc. to take advantage of the information technology infrastructure.
- Virtual teams must become an organizational tool for speed-up of most processes (speed of delivery, product design, environmental reaction, innovation, implementation, etc.) in order to be classified as success stories.
- Face-to-face socialization meetings are periodically desirable for "contact" and "celebration" among virtual team members.
- Establishing the essential element of trust among virtual teams must receive high priority (and may be difficult) because of a lack of face-to-face interchange.
- The lack of an actual work site and the resulting mental hurdle this creates for many managers and workers must be overcome through both personnel selection and training system initiatives.
- The key idea of using virtual teaming to take advantage of technology and capitalize on existing "experts" within or across organizations must be constantly emphasized.

Conclusions and discussions

During the 1990s, we have witnessed the rapidly changing business environment including the globalization of economy and competing with information systems. With the globalization of business, the nature of competition becomes global. Today's manager leads a global workforce and manages worldwide operations across national boundaries. The globalization of business creates a new challenge and opportunity for assembling teams who must collaborate closely even though they are separated by national boundaries, time, and organizational barriers. The use of computer-mediated communication technologies and other groupware technologies briefly discussed earlier provide a workable, reliable, and flexible base of systems for creating the platforms for virtual teams and virtual organizations.

The virtual/global/networked team, for example, presents a new way of organizing global workforces to harness an information age opportunity for mobilizing hidden manpower through the use of the computer-mediated communication technologies to overcome the barriers created by geographical distance and time. The virtual team consists of a group of people who collaborate closely even though they are separated by space (including national boundaries), time, and organizational barriers. These virtual teams equipped with information technologies are invalidating the old 50-foot rule – "If people are more than 50 feet apart they are not very likely to collaborate." (Lipnack and Stamps, 1997).

The virtual team is a new avenue to overcome the limitations of traditional teams. The virtual team is characterized by the following:

- *Transcendency*. Virtual teams can transcend time, distance, organization size, and technologies because telecommunication technology can allow the team members to communicate (synchronously or asynchronously) with one another via computer conferencing systems, the Internet-based virtual meeting system, and electronic meeting systems. A shortcoming of traditional teams includes the necessity of face-to-face meetings in a conference room and there was no technology available to support a remote member who belonged to traditional teams.
- *Infinity*. Virtual teams can have an infinite number of participants. Network technology and groupware enable the participants from anywhere in the world to

share information in a data server. Infinity, which is one of the characteristics of network technology, enables virtual organizations to mobilize a large number of employees to assemble virtual teams. According to Lipnack and Stamps (1997), the NCR Corporation assembled a virtual task team of more than 1,000 people working at 17 locations to develop a next-generation computer system. With high-speed telecommunication networks and information systems technologies, the virtual task force team completed the project on budget and ahead of schedule. The number of participants in a traditional team is limited to reduce the cost and time of meeting (Harper and Harper, 1994).

- *Anonymity*. Virtual teams enable the members to keep their participation anonymous, because it can be also designed to conceal the identities of those involved in the virtual team and even to conceal the existence of the team itself. These characteristics can significantly reduce the limitations and the problems of the traditional team. A traditional team may be more vulnerable to security problems as it is based on face-to-face meetings.

A fundamental issue in making the virtual organization successful is trust, when only virtual interaction is possible. Many point out that the virtual context constrains or even impedes the development of trust (Jarvenpaa *et al.* 1998). Groupware such as desktop conferencing systems and video/multimedia conferencing systems play the pivotal role to increase positive relationships among the members of the virtual teams. According to Nakamura *et al.* (1996), Fujitsu Limited Co. of Japan has successfully used the videoconferencing system to develop positive interpersonal relations between conference attendees. In addition, a number of strategies may be used to reinforce trust in virtual teams in order to improve the team process outcomes. They include proactive behavior, rotating team leadership, task goal clarity, role division, frequent interaction with acknowledged and detailed responses to prior messages. Although the telecommunication system cannot be a substitute for face-to-face communication, it will facilitate the development of commitments among virtual team members. Information technology definitely has the capability to assist teams in becoming dynamic entities in the new millennium. The use of information technology may have a greater impact on the team dynamic than the traditional approaches of striving to improve face-to-face interpersonal communication.

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