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Introduction

Recently, we have witnessed several significant business and economic trends that have revolutionized the way we live and conduct our business. They include the globalization of business, the emergence of the stateless corporation and networked global corporations (virtual global corporations), and the emergence of the Internet and other data communication technologies. As the global marketplace expands, many multinational corporations (MNCs) have been influenced by mounting pressures to develop worldwide communication, distribution, and information networks that facilitate the free flow of information and goods across national boundaries. Such developments of telecommunication infrastructures allow many MNCs to implement global communication networks as a strategic weapon to help survive fierce global competition. Consequently, we will witness ever-increasing virtual phenomena, such as virtual workers, virtual offices, virtual teams, telecommuting, and virtual corporations. This paper discusses the emergence of new types of information technologies, virtual technologies, to support networked global corporations (virtual corporations). We discuss the virtual technologies to support the networked global corporations in communicating, decision making, creating and sharing data, and knowledge and the future of virtual technologies.

Definition of the Networked Corporation (The Virtual Organization)

Consensus has not been reached in defining the virtual organization. There are basically two types of definitions of the virtual organization with respect to its temporal dimension.

1. The virtual corporation as a temporary consortium

According to Hardwick and Bolton (1997, p.59), an industrial virtual enterprise is defined as: A temporary consortium of independent member companies coming together to quickly exploit fast-changing, world-wide product manufacturing opportunities. Industrial virtual enterprises assemble themselves based on cost-effectiveness and product uniqueness without regard for organizational sizes, geographic locations, computing environments, technologies deployed, or processes implemented. Virtual enterprises share costs, skills, and core competencies that collectively enable them to access global markets with world-class solutions their members could not deliver individually. Many companies cannot do everything well. This fact has lead many companies to reach partnership arrangements, such as strategic sourcing, alliances, and virtual corporations. Virtual corporations integrate a company’s core competency operations with those of other companies. Collaborative computer networks allow corporations to form and dissolve/dismantle relationships at an instant’s notice.

2. The virtual corporation as a permanent organization (consortium)

A virtual corporation can be defined as an organization that coordinates economic activity to deliver value to customers using resources outside the traditional boundaries of the organization. Growing competitions have forced many companies' downsize pervasively, using the production lines of other companies. Notably, many high tech corporations in Silicon Valley have used this strategy. The virtual corporation can be compared as a company with a head (research and development, strategic management of production, marketing, financing, etc.), but no body (manufacturing facilities). TelePad, a manufacturer of Pen-based computers, was launched with no manufacturing facilities at all. Whether we define the virtual corporations as temporary or permanent ones, a common thread is collaborative networks linking people together across time, space, and organizational barriers.

Systems to Support Global Networked Corporation

Groupware research and development efforts have been directed toward the development of virtual technologies for information storage and retrieval, communication, and decision making.

1. Providing Effective Means of Global Data Storage and Retrieval:
Perhaps, the World Wide Web and Intranet has become the most important technology infrastructure for data storage, retrieval, and communication. The web-based solutions are low cost vehicles for easily accessing, analyzing, and distributing timely business information from corporate databases through on-line analytical processing (OLAP). Sun Microsystems, whose motto is “The network is the computer,” has implemented the world’s largest Intranet in terms of Web servers. The company calls its Intranet that connected about 3000 servers to it SunWEB. Not only Sun Microsystems, but also virtually every organization and corporations or not-for-profit organizations, now using WWW and intranets to publish important information such as financial, marketing, product, and human resources information on the Web. Other types of technologies include workgroup database management systems (DBMS), workflow automation systems, workgroup scheduling (workgroup calendaring), and workgroup shared textbase systems.

2. Providing effective means of communication among various units of the MNC as well as virtual teams

A taskforce team has long been considered one of the most powerful organizations to cope with complex, interdependent, and transient tasks in a turbulent and uncertain business environment. A virtual team is a product of recent computer communication revolution to effectively deal with a specific task that cannot be done either as efficiently or as effectively through current organizational structures and policies. The virtual task force team consists of a group of people who collaborate closely, even though they are separated by space (including national boundaries), time, and organizational barriers. According to Lipnack and Stamps (1997), today’s virtual teams are an established feature of global companies, such as Hewlett-Packard, Motorola, Bank of Boston, and Steelcase, through an array of electronic technologies include e-mails, computer conferencing such as e-mail meeting, desktop conferencing, teleconferencing, videoconferencing, multimedia conferencing, and collaborative writing/programming/drawing systems. For example, 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 groupware technologies, the virtual team completed the project on budget and ahead of schedule (Lipnack and Stamps 1997).

3. Providing Effective Means of Global Customer Support

Global customer support involves many extra dimensions with which pure domestic corporations do not have to deal. Global customer support must deal with multiple dimension of space, time, spaces, languages, and other factors. One of the best customer-oriented information systems can be found at the Federal Express Corporation. FedEx now has global customer support system-- COSMOS(Customer Oriented Services and Management Operating System). The COMOS system allows customers sign onto the Internet and let them trace their packages’ exact location and time as well as every step of the trip history, whether they are in the air or on the ground. In tracking every movement of the packages, the company also developed numerous other related systems that can give synergistic benefits to the customers (Janz and Wethebe 1998).

4. Providing effective decision making tools

The concept of group decision support systems is built on that of decision support systems. Since the 1980s, much attention has been given to the area of group decision support systems (GDSS). During the early 1990s, the concept of group support systems (GSS) emerged to present a more encompassing view of supporting decision and communication needs of workgroups. A GSS is defined as a computer-based information system 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 workgroup. Dennis et al (1988, p. 593) defined Electronic meeting systems (EMS) as umbrella term systems to include group decision support systems (GDSS), group support systems, and CSCW. Although researchers in the CSCW and EMS areas seem to agree that these two classes of systems will completely overlap, they may be in disagreement in deciding the umbrella term. CSCW researchers believe that CSCW is the comprehensive term that includes EMS as a subset of CSCW, whereas Dennis et al presented an encompassing view of EMS that includes CSCW as a subsystem.

The Future of Virtual Technologies

1. Synchronous and asynchronous communication systems are being integrated

According to Hibbard (1998), many groupware companies (e.g., Lotus, Microsoft) are acquiring developers of real time conferencing technology to integrate their technology into their asynchronous communication products. In the very near future groupware will combine synchronous (same time) and asynchronous store-and-forward technology into one
server. The new synchronous collaboration technology permits workgroup members to detect a list of workgroup members who is viewing a Web page at the same time and to open a spreadsheet/document and co-edit it in real time. These changes can be seen by all workgroup members simultaneously.

2. EDI and the superworkgroup (Cross-organizational teams) software

Groupware was originally designed to increase the productivity of workgroups within an organization. An emerging trend is that many companies are applying groupware technology to increase business-to-business collaborations (e.g., collaborations among the companies, its customers, and its suppliers) over intranets and extranets. Some companies are already using intranet-based superworkgroup (workgroup among business partners such as customers and suppliers) software to automate their purchasing processes. The superworkgroup software includes E-mail and workflow management software that is based on business rules and operating procedures. Some predict that Electronic data interchange (EDI) will be replaced by superworkgroup software because it is easy to use and to implement (Adhikari 1998).

3. Internet-based collaboration products

More and more groupware will be inextricably tied to Internet technology. Especially, the World Wide Web is becoming the platform for next generation of groupware applications. Many groupware products such as Lotus Development’s Domino and Microsoft’s Exchange are integrating more Internet protocols into them. Microsoft’s next version of Office suite is expected to completely remove the boundaries between the World Wide Web and groupware. Web-collaboration software is projected to account for one-third of the two billion dollar groupware market by the year 2000, due to the capability of eluding the firewall restriction of large groupware systems and its ease of use and installation (Copeland 1998).

4. Expanding groupware into knowledge management

Many leading groupware development companies such as Lotus, Microsoft, Novel are expanding groupware into knowledge management. The movement and expansion into the knowledge management is to shift the focus to the realms of searching and interrogating databases. Knowledge management is the activity of representing and processing knowledge (descriptive, procedural, and reasoning). Knowledge management techniques include text management, forms management, database management, spreadsheet analysis, rules management, report generation, etc. Of these techniques, groupware is focusing on searching and interrogating databases of various types such as Notes databases, relational databases, and file systems. Users, for example, can perform a single search across multiple repositories such as Notes databases, relational databases, and file systems. Groupware allows companies automatically categorize indexed documents into a hierarchy of topics including full-text indexing of all e-mail, documents, tasks and schedule entries.

References
Available upon Request.