The impact of Information Technology on the American culture in the last 50 years

By

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Abstract

The application of information technology (IT) has played a major role in the transformation of the American culture over the past 50 years and is likely to have even greater effects in the future. Using Moore’s Law, Kurzweil’s Law of Accelerating Returns, and the existing literature on cultural impact of information technology, the paper examines the effect of information technology on the American culture, especially in the last 50 years. Included in the discussion is a brief tour of memory lane on technology through history for the last fifty years. The technological influences on culture and society -- the impact of the industrial revolution, the impact of the computer and the impact of the Internet are described. The paper concludes with a brief description of the future of information technology on the American culture, providing direction to the American public to focus on unique application-specific challenges and opportunities and “value-added” points of distinction for the emerging Internet Telephony market.
Impact of information technology on American culture

Introduction

As we breakthrough into the twenty-first century, the culture in which our society operates is increasingly turbulent, rocked by forces such as globalization and rapid technological changes. Technological advances have dramatically changed the make-up of America’s culture, which is perhaps now the most advanced and ethnically diverse in history, in addition to having the greatest transformation in history. These developments are profoundly affecting the way in which Americans view themselves, just as they are influencing individuals' behaviors and attitudes to and expectations of both society and people.

The expanded technological capabilities have created an American culture in which data, information, and knowledge can be accessed from anywhere, anytime by almost anyone and used for almost any purpose. As the tools of such information technologies as the Internet, multimedia computers, virtual reality, and artificial intelligence mature, the implications of these technologies on the American society are enormous. The better citizens’ needs and expectations fit with the requirements of the culture of the society the happier the citizenry and the society will be. The more successful the society, the more defined its culture tends to be, and the more
that the citizens will be expected to either embrace them or find ways to change them.

In this paper, the author considers the history of the political, economic, and social implications of the Information Technology. The paper examines the relationship between technological and social change, the role of information technology in shaping the American culture, and technological and social continuities between the past and the present. However, as culture and information technology are both subjects that attract a lot of debate whenever they are discussed, some definition of terms as used in this paper will be appropriate.

**Definition of Terms**

*What is culture?*

Culture is one of those terms that are difficult to express distinctively, but everyone knows it when they sense it. The word “culture” is used with many different meanings in everyday spoken language and in scholarly literature. Social anthropologists in the late nineteenth and early twentieth century studies of primitive societies used the term “culture” originally. It was used to describe the primitive societies’ ways of life that were not only different from the more industrialized parts of America and Europe, but were often very different among themselves (Kotter & Heskett, 1992).
A culture is the way of life of a group of people. Every group of people has a culture. The language we speak, the clothes we wear, the food we eat, and the religion we believe in are all part of our culture. For example, Native American Indian groups that shared the same culture had the same way of finding food and building houses. They depended on the same natural resources and used them in the same way. The Plains Indians, for instance, shared the same land, dressed the same way, spoke the same language, hunted for food, and practiced religion in the same way. That is why they are considered to be their own culture group.

Formally, the American Heritage Dictionary defines “culture” as “the arts, beliefs, customs, institutions, and all other products of human work and thought created by a people or group at a particular time” (Houghton-Mifflin, 1994, p.169)

**What is the American culture?**

American culture is the values and beliefs that have given meaning and shape to the experiences of the American peoples. In his book, The ABCs of American Culture, (Nussbaum, ) defined American Culture in terms of Ten Commandments. These Ten Commandments are not really commandments in the religious or moral authority sense, rather, they are popular sayings that capture the true meaning of American culture. According to (Nussbaum, ), the first commandment is that “You can’t argue
with success (Be a success).” In American life, success is probably the most praised thing. It relates to so many other characteristics of American life—individualism, freedom, goal setting, progress, and experimenting, social mobility, making money, doing what works, and expecting good things to happen. Americans want to “make a success of themselves.” This is the “American Dream” which has attracted millions of immigrants and been taught to generations of American children. Everyone wants to be a success at something. Those who do not think that way are considered as failures.

The second commandment says “Live and let live (Be tolerant).” Americans love freedom and privacy. That means Americans love to be left alone. They don’t want anyone interfering in their affairs, giving them advice, or trying to run their lives. They want people to “stay off their backs,” “stay out of their way,” and “mind their own business.” Perhaps Live and let live should be listed as the first commandment of American culture, even more important than success. It means that no one should object to anyone else’s way of living. If you like opera and I like country music, that is fine. If you want to get married and I want to live with someone without marrying her, that is fine too. Neither of us should try to influence the other or object to the way the other lives.
The third commandment of American culture is that “Time flies when you’re having fun (Have lots of fun).” Americans try to have as much fun as possible, which comes through various kinds of entertainment, especially TV. But they also try to turn other activities into fun, for example, shopping, eating, and in case it is not enough fun, they will put a playground inside the fast-food restaurant so the kids can have fun playing while the grown-ups have fun sitting and eating. Learning to read can be turned into fun, as the Sesame Street TV programs show. Having fun is the major preoccupation of youth, retired people, and many of those in between. In most situations Americans are very time-conscious. They know how long it will be till their next appointment, how long till this workday is over, and how long it will take to drive home. However, they forget to watch the clock when they are having fun. That is why “time flies,” or time seems to go by very quickly.

The fourth commandment says, “Shop till you drop.” Shopping is a form of recreation for most Americans. Even if Americans are not shopping for anything in particular, they simply enjoy looking at all the options. They love the whole process of choosing what to buy and where to buy it. It is a major topic of social conversation. If you want to impress an American friend, convince him or her that you are a “smart shopper.” The saying, Shop till you drop, is never used seriously as a command yet it
Impact of information technology on American culture

holds a serious meaning. Americans are perhaps the ultimate consumer society, and this saying describes America so well that it could be its national motto.

The fifth commandment of the American culture is “Just do it.” Americans are people of action. They do not like too much planning. That seems indecisive and perhaps a waste of time. Americans do not like too many rules and regulations that prevent action. They strongly dislike authority structures where people are expected to inform several other people before they do anything. They get an idea and they want to just do it. Action is seen as the key to success. Action is more valuable than planning, checking regulations, or informing people.

The sixth commandment says, “No pain, no gain (Get tough. Don’t whine).” Americans are always seeking to gain something or improve something. They expect to have to work to achieve their goals. Success usually comes with pain and sacrifice. It will not happen by itself. If someone often complains about how hard something is, we call that person a “wimp.” Americans look down on such people. The ones that are often admired are those who know what they want and do not mind the pain it takes to get it. They follow the Sixth Commandment, “Get tough.”

The seventh commandment states, “Enough is enough. (Stand up for your rights).” In American thinking, human rights and dignity are so basic that it is assumed everyone else must
think the same way. This proverb implies the command, “Stand up for your rights.” In the American Revolution for example, America as a nation said to Britain, Enough is enough, that is, “You have ruled us for long enough. You will not rule us any more.”

The eighth commandment says, “Time is money. (Don’t waste time).” Most Americans are very time-conscious and very money-conscious. Most get paid by the hour for the work they do. They exchange their time with the employer in order to get money. The idea that time is money has gotten into American minds so deeply that it affects their whole lives. Wasting time is as bad as wasting money, so everything is scheduled and they hurry everywhere. Americans often signal the end of a phone conversation or a meeting by saying, “Well, I don’t want to take up any more of your time.”

The ninth commandment of the American culture says, “Rules are made to be broken. (Think for yourself).” Americans obey rules most of the time, but they see rules as someone else’s idea of how they should do things. They think the rule might have been appropriate in some other situation but it might not be appropriate for their situation now. Therefore they break it and do what they think is a better idea. This proverb implies the commandment, “Think for yourself in every situation. Do not just obey rules.” Though Americans say, Rules are made to be
broken, they never say, “Laws are made to be broken.” Laws are official legal “rules” and people proudly claim that in America, “No one is above the law.”

The tenth and final commandment says, “God helps those who help themselves. (Work hard).” In a list of “Ten Commandments,” one might expect that God would be mentioned in the first commandment rather than the last one. But in American culture, God actually does come at the end of the list. For most Americans, God is much less a concern than success, money and time. Although there are many Americans who put God at the top of their personal list of priorities, they are a minority within American culture. *God helps those who help themselves* could mean that God blesses people who work hard or it could mean, “God doesn’t really help anyone. Ones success depends on the individual, not God.” Either way, the proverb points to the same commandment, “Whether you believe in God or not, work as hard as you can.” It is better to be independent than to depend on other people.

**What is Information?**

*Information* is stimuli that have meaning in some context for its receiver. Some (if not all) kinds of information can be converted into data and passed on to another receiver. Relative to the computer, we can say that information is made into data, put into the computer where it is stored and processed as data,
and then put out as data in some form that can be perceived as information.

**What is Information Technology?**

The term *Information technology* (IT) is used to mean all forms of technology used to create, store, exchange, and use information in its various forms (that is, business data, voice data, still images, motion pictures, multimedia presentations, and other forms, including those not yet conceived). The term includes both telephony and computer technology in the same word. It is the technology that is driving what has often been called "the information revolution."

**What is Moore’s Law?**

In 1965, Gordon Moore, the then chairman of Intel and an inventor of the integrated circuit (IC), predicted that the surface area of a transistor (as etched on an IC) was being reduced by approximately fifty percent every eighteen months. The result is that twice as many semiconductors can be packed on an IC, which doubles both the number of components on a chip as well as its speed. Since the cost of an integrated circuit is fairly constant, it implies that every eighteen months to two years, twice as much circuitry running at twice the speed for the same price can be achieved. This has a quadrupling effect of value for many applications. This observation holds true for every type of circuit, from memory chips to computer processors.
This insightful observation became known as Moore’s Law on Integrated Circuit, and the remarkable phenomenon of the law has been driving the acceleration of computing for the past forty years.

**What is the Law of Accelerating Returns?**

In his book, the Age of Spiritual Machines, Kurzweil (1999) defined what he proposes as the Law of Accelerating Returns (Kurzweil, 1999). According to Kurzweil, this law states that “the time interval between salient events grows shorter as time passes” (p.30). What this means is that technology allows significant evolutionary advances to occur at an accelerated rate. For example, it took early humans thousands of years to perfect the domestication of animals, while Moore’s Law has shown an exponential growth in the power of computing over the past century.

The Law of Accelerating returns applies specifically to evolutionary processes. In the evolution of technology, the ever-improving human methods of recording information have fostered further technology. The evolutionary process of technology seeks to improve capabilities in an exponential fashion. Like any evolutionary process, technology builds on itself, which continues to accelerate when the technology itself takes full control of its own progression.
Technology through History: 1950 - 2000

In the 1950s, consumerism in its many guises was the major theme in America. At the beginning of the century, most people worked to survive and sometimes prosper. In the 1950s many people work to acquire the "American dream." In 1950, Diners' Club introduces the first charge card, a prototype of the credit card. It had to be paid off in full monthly. In 1951, the first commercially available computer, UNIVAC I (universal automatic computer) was completed in Philadelphia and turned over to U.S. Census Bureau. In 1952, Rolodex introduced the "Rolomatic", featuring a ball-bearing clutch mechanism. In 1954, TV dinners are introduced in the United States, and there were fifteen computers in the United States. In 1957, John McCarthy founds the Artificial Intelligence Department at the Massachusetts Institute of Technology. In 1956, IBM introduced the hard disk (RAMAC) for data storage. In 1957, Smith-Corona makes a portable electric typewriter weighing 18.3 pounds (more than its manual predecessor). In 1958, Jack Kilby of Texas Instruments conceives the integrated circuit, and Bell Laboratories introduced the modem dataphone, using telephone lines for transmitting binary data. 1959 saw the introduction of the first commercial Xerox copier (The-Smithsonian-Institution, 1998).

In 1960, PDP-1, the first commercial computer with keyboard input and monitor to display entered material was introduced.
That same year, Quickborner management consulting group began to develop the "office landscape" concept, with workspaces organized to reflect flow of information and communications patterns, and the Halogen lamp was introduced. In 1961, IBM introduced the Selectric typewriter, in which characters are printed on paper by a rotating ball while the carriage remains fixed. In 1962, Philips introduced the "Compact Cassette" for recording sound on magnetic tape. Digital Equipment Corporation and MIT's Lincoln Laboratory developed the first "personal computer" (LINC) intended for a single researcher. Each LINC computer cost $43,000. In that same year, the world's first telecommunications satellite, Telstar, was placed in orbit, creating worldwide communications network for handling telephone, television, and data transmission. In 1963, the first push-button telephone was introduced. Fiber-tip pen was developed in Japan by Pentel, initially using a bamboo inner barrel to feed ink into the fiber tip (in 1966, the bamboo barrel was replaced by a bundle of acrylic fibers that transferred ink to the tip by capillary action). That same year, a direct telephone link, the "hot line," was established between the White House and the Kremlin. In 1964, the number of computers in the United States grew to seventeen thousand (up from fifteen in 1954). In 1967, a Senate subcommittee hears testimony predicting that by 1985, Americans would work twenty-
two hours each week, twenty-seven weeks a year, or they would retire at thirty-eight years old. In 1969, ARPANET, the "Mother of the Internet," is begun as a U.S. government experiment linking researchers with remote computer centers and allowing them to share hardware and software resources. Also in 1969, approximately 225 million telephones were in service in the world, 114 million of which were in the United States (The-Smithsonian-Institution, 1998).

The 1970s saw more movement to bring women's wages up to par with men's. In 1970, women constituted thirty-eight percent of the labor force and more than ninety-seven percent of the secretarial force. That same year, floppy disk for computer data storage was introduced. In 1971, U.S. Centron introduced the Dot matrix printers and Texas Instruments introduced the first pocket calculator, the Pocketronic. It weighed about 2.5 pounds, cost $150, and could add, subtract, multiply, and divide. In 1972, Lexitron introduced the first word-processing system. In 1974, a by 3-M engineer, Art Fry invented the Post-It Notes in response to a need for bookmarks that do not slip out but are easily removable. The United Nations set the first international fax standard, allowing facsimile messages to be transmitted at a rate of one page every six minutes. 1975 ushered in "Electric Pencil," the first word-processing software package for personal computer, and IBM introduced the laser printer. Concept for
"Workbench" modular office system designed by Bruce Burdick at Herman Miller to meet the needs of "Knowledge Workers." In 1976, Steve Wozniak and Steve Jobs formed the Apple Computer Company on April Fool's Day. The following year, Paul Allen and William Gates founded Microsoft. In 1979, the first commercial network of cellular telephones was set up in Tokyo, Japan. The first spreadsheet software program, "Visicalc," was introduced for the Apple II computer that same year (The-Smithsonian-Institution, 1998).

Between 1973 and 1989, the average American's work-week jumps from less than forty-one to nearly forty-seven hours, and the average American's leisure time decreased thirty-seven percent, from 26.2 hours to 16.6 hours per week. In 1981, IBM introduced a personal computer based on the Intel 8088 processor and using a disk operating system (DOS) developed by Microsoft. Osborne built the first portable computer with video monitor, disk drives, and processor unit mounted in a single box. In 1983, the notion of "laptop" computer was introduced with Tandy Radio Shack TRS-80, model 100. In 1984, Philips and Sony introduced CD-ROM, an optical disk that can store up to 270,000 pages of typewritten information. Apple Computer introduced Macintosh, a microcomputer with icons, a "mouse," and an intuitive user interface. That same year, AT&T (founded in 1885) monopoly was broken by the courts into smaller regional
companies. In 1985, Microsoft develops "Windows" for the IBM PC. In 1988, the first transatlantic optical fiber cable is laid; it can carry 37,800 voice channels. Scriptel introduced a method for inputting data into a computer by writing on a screen. By 1989, 7% of all U.S. workers use a computer at work (The-Smithsonian-Institution, 1998).

In 1990, fifty-eight percent of American women and seventy-six of men were in the labor force. Four out of five clerical jobs belonged to women. In 1991, President George Bush signed a job discrimination bill requiring that hiring and promotion be related to job performance. In 1991, Anita Hill submitted an affidavit to the House Judiciary Committee stating that between 1981 and 1983, Clarence Thomas had sexually harassed her while working for him. In 1991, the U.S. Congress created the Glass Ceiling Commission to study problems in advancement in employment for women and minorities. In 1992, Americans with Disabilities Act is passed. In 1993, there were 4.9 million secretaries, stenographers, and typists in the United States. In 1993, 7.6 million people work at home during normal business hours. In Iowa, $200 million 2,800-mile fiber-optic network completed connecting all ninety-nine counties for broadcasting of college courses, communication among state agencies, distribution of lottery tickets, maintenance of voter registration lists, and linkage of libraries. In 1994, forty-one
million, or one-third, of the work force was self-employed in part-time, full-time, and second jobs. In 1994, the nation's 3.5 million female secretaries constituted ninety-eight percent of the profession. It was the largest job category for women. In 1994, seven million Americans occupied fifteen million jobs. In 1994, the Internet reached nearly twenty-five million computer users (an increase from 213 registered computers in 1981) (The-Smithsonian-Institution, 1998). In 1995, the National Science Foundation (NSF) created the Partnerships for Advanced Computational Infrastructure (PACI), building on and replacing the Supercomputer Centers program that helped establish its leadership role. In October 1996, President Clinton announced the Next Generation Internet (NGI) initiative, led by the NSF. Grants were awarded to universities to connect to the advanced high-performance computer networks that will constitute the Internet of the future. In 1997, the NSF, with cooperation from the Department of Education's National Institute for Disability and Rehabilitation Research, made a three-year, $952,856 award to the World Wide Web Consortium's Web Accessibility Initiative to ensure information on the Web is more widely accessible to people with disabilities (The-National-Science-Foundation, 1997). In March 2000, the NSF emphasized on research into the information technology workforce with focus on women and minorities in IT professions.
Technological Influences on Culture and Society

Before considering the social role and impact of information technology in particular, it is helpful to consider the characteristics of technology in general in terms of its development, distribution, and use. First, when considering relationships between technology and culture, it must be clear just what culture we are talking about. Failure to do this is one way in which inappropriate technology is applied in some societies. This paper will be talking about Western, post-industrial societies, specifically, the American culture.

Information technology plays an increasingly important role in nearly every part of our lives through its impact on work, commerce, scientific and engineering research, education, social interactions, and our culture. The development of computers and semiconductors and the accompanying trend toward miniaturization is having equally profound effects on society as well. The possibilities it offers are enormous, but so are the possibilities for work-force displacement by automated systems, for invasion of privacy and the possibility of being used for evil purposes.

This last point was made clear when on Tuesday, September 11, 2001, a day that will remain indelible in the hearts and minds of all Americans and indeed, all of humanity, a bunch of men who profess the Islamic faith, hijacked four American
commercial airlines and used them to slam into the World Trade Center towers in New York and the Pentagon in Washington DC, killing thousands of innocent civilians and wrecking havoc on the American culture. While the effect of that attack on America is yet to be told, it would not be an overstatement to say that the American culture as we know it will definitely change. For Americans who take their privacy and fun times among other things very seriously, that tragic event would redefine so many conveniences that we use to take for granted. For example, going through airports now will require a thorough searching of people’s personal effects with perhaps visible presence of armed security personnel wielding guns. There would be other fallouts from the attack but one could easily predict that the assault on the American culture would be enormous.

**Impact of the Industrial Revolution**

The Industrial Revolution ushered the west into the age of technology. Today, the machine dominates western societies, which was unknown before the eighteenth century. The first inventions of the Industrial Revolution came about out of necessity. England had experienced a wood shortage, and the search for alternate sources of power, in the form of coal, mandated the creation of a mechanism to more efficiently mine the coal. The Steam engine, the answer to this problem,
revolutionized not only the mining of coal, but also the transportation industry.

The Industrial Revolution had a profound effect on all levels of society in the late 18th and early 19th centuries. The way people lived and worked changed significantly during this time. Until the Industrial Revolution evolved, people worked peacefully and serenely out of the quiet of their homes. But that soon all changed, people started to move away the coal mines and textile factories to the big and vibrant cities.

In sparsely populated America, the needs of a new nation required rapid and simple means of production. Machines augmented the scant work force and served to make entrepreneurs more productive (Anderson, 2001).

Impact of the Computer

Today’s children are growing up in a different world. As Tapscott states, "Growing up is about learning. However, the economy and society these kids are growing into is very different than that of the baby boomers. The destination is different and so is the route the kids must take" (Tapscott, 1998). Tapscott advocates technology and wants educators to rethink the teaching and learning process to take full advantage of all it has to offer. Hypermedia, simulations, and other empowering technology applications are a natural part of education, the author contends, when learning is student-
centered and when teachers act as facilitators. Tapscott believes that technology has essentially no negative impact on children, he envisions children developing faster and creating a New World with technology.


One of the impacts of computer technology has to do with the social and cultural changes that inevitably occur. One important aspect of this is the way it changes the process of interpersonal communication. For example, microcomputer users are beginning to form on-line communities (electronically based communities organized around the exchange of information about common interests). However, in some computerized workplaces, employees report increased isolation and a lack of human contact on the job.

Computers have affected our social system out of which they were developed. Although we are used to computers doing what we tell them to, it is also true that computers tell people what to do. After we tell the computer what to do, we create an environment that defines our pattern of activity. One case in point, once we have designed a computer's data base architecture and specified data entry formats for a particular application, we often find ourselves limited to defining tasks and problems according to the computer system's capabilities and
requirements. If it's easy to do on the computer, we do it. If it's difficult or impossible, we don't. For example, if a library has a computerized database of journals going back to 1980, researchers often do not take the time to look at older references. Also, if a particular topic is not easily searched by keywords, fewer people have the persistence to research it anyway.

The advantage of the rationalization of culture has been the development of universalistic social relationships. We are able to form larger communities and treat strangers with less suspicion. The disadvantages have been individual isolation, reification of social relationships, and a weakening of shared norms and values. Computer-based communication shows evidence of being a continuation of the trend towards universalism in social interaction (Perrolle, 1998).

In societies where individuals can choose their jobs, their religious and other group memberships, and can raise or lower their social rank through education and effort, a person's place in the stratification system is only partly inherited. During the social mobility process people rise or fall from the status they received at birth. Where mobility is possible, the institutions of family and education are where people acquire the skill and training to be "successful" or are judged "failures". The computerization of work has become a major
mechanism by which the computer alters social stratification. Because so much of a person's social status in American society depends upon his or her occupation, changes in the types of work people do (especially if there are corresponding changes in wages and salaries), can drastically change the stratification system. If many new jobs are created at the "top" of the social structure, more individuals will have opportunities for success and status. If, on the other hand, new jobs are created at the low-wage "bottom", it will be more difficult for individuals to gain social status. But in America, computers have not been seen as appropriate for use by men alone, which implies that status opportunities for women have been made possible to women. The educational institutions have not provided computer science education mostly to middle class children, leaving poor and minority children with greater barriers to occupational success. There may be other socioeconomic factors that may have prevented some from moving up the social strata, but it's not because computer science education has not been made available to all.

**Impact of the Internet**

The Internet has emerged in recent years as a phenomenal engine for U.S. economic growth and development. The change from an industrial society into an informational society is comparable to the impact of the industrial revolution, during which society changed from a decentralized feudal society into a
centralized industrial economy. But this is as long as the analogy goes. Contrary to the industrial revolution, the informational revolution has imposed itself with a speed that leaves people breathless. This has created what some call a "digital divide."

There is now a digital divide between Americans of all works of life. The digital divide is not just one, but actually three digital divides. The first digital divide has to do with the uneven distribution of Internet access. This gap will be closed someday by universal PC ownership and universal Internet access. But a second digital divide, which is called the experience gap, will continue to exist (Fleisher, 2000). Lower socioeconomic groups who have only recently gained Internet access will not derive significant benefit in the near-term due to the steep learning curve that accompanies any new, complex technology. This experience gap will evaporate over time, but it is very real today.

The concept of community is based on geographical proximity and repeated patterns of social interaction in a group that shares a common culture. A community defines its membership boundaries, instills a sense of identity and solidarity among its members, and develops mechanisms of social control. Strong social ties of family and friendship are common in communities. In addition, a community's network of weak social ties, such as
between acquaintances, is dense. However, the Internet has changed all that with its own concept of virtual community.

Virtual communities exist in real life as geographically disbursed groups who manage to maintain themselves using communications and transportation technologies. In the United States, beginning with Berkeley, California's Community Memory Project, geographically based communities have experimented with ways to provide electronic support for their social structures. One good example is the town of Blacksburg, Virginia, which created the Blacksburg Electronic Village with about half of its residents participating in the project (Carroll & Rosson, 1996).

Since the beginning of the Internet, scientists, scholars and students have used it to support their social networks. Organizations like the Association for Computing Machinery (ACM) provide journals, conferences, and member services on-line. For most professional groups, periodic face-to-face meetings with colleagues are an important part of developing a professional community. In addition, new groups have formed in newsgroups and real-time interactive communication networks. New virtual communities are emerging to support the activities of "real" communities. Many of these are organized for research or educational collaboration. Many do not accept guests, but have interesting Web sites describing their projects.
Not everybody or every organization is in support of the alternative to community. One such organization is the Christian Coalition. This movement which is closely associated with the conservative clergy, persisted in identifying the Internet with demonized elite institutions, and as an instrument of cultural invasion (Agre, 2000). Although such an organization operates nationally and uses the Internet to coordinate its political activism, but as far as their political agenda is concerned the Internet is entirely alien. Their hopes for community are resolutely geographical, and they are indifferent to attempts to recover a nostalgic sense of community online. But as Moore’s Law continues its relentless journey into the realm of the smaller, faster, and cheaper, the acceleration of new technology introductions will increase. As it does, the Law of Accelerating Returns is there to aid and abate them.

Politically, the Internet has evolved into an essential tool in political organizing. Most American citizens with any political interest almost spontaneously now turn to the Internet as a way to express themselves and organize campaigns to advance or derail a cause or candidate on the national, state or local level. If it is on the national agenda, the chances are there is an Internet lobbying element of it as all sides of an issue try to mobilize their base and the masses. Whether it is the tax cuts, campaign finance reform, tuition tax credits for private
school education, drilling for oil in Alaska, Medicare and Social Security reform, prescription drug benefit, a strategic defense initiative, there is an Internet component for it.

On tax cuts for example, the Republican National Committee launched an impressive site, www.bushtaxrelief.com, which allowed users to calculate their tax cut, read the President's address to Congress and reaction to it, and watch a video. The Web site urged visitors to call into talk radio, write letters to the editor, forward e-mail to a friend, and contact their members of Congress in support of the legislation.

In the fight over John Ashcroft's nomination to be Attorney General both his supporters and his opponents used the Internet to rally their base and put pressure on members of the Senate. For example, an anti- Ashcroft Web site setup by the People For the American Way (PFAW) attracted one million visitors in two weeks, without any collateral advertising. Of those that visited the site, about one in ten signed an online petition opposing the Ashcroft nomination (Buie, 2001). More than 130,000 people signed the petition, which were presented to Senators by the PFAW. Although the rapid-fire mobilization was not enough to derail Ashcroft’s confirmation, it focused attention on the intense expression of opposition among progressive activists and
may have helped convince or reinforce some of the 43 Democratic Senators who voted to oppose the nomination.

**Future of Information Technology on the American Culture**

In the second half of the twentieth century, advances in computing and communications theory and practice made information technologies. With the current convergence of computing and communications, we find ourselves at the crescent of an exciting future. America is still the leader in information technology, both in innovation and product development, but there are many challenges ahead in the twenty-first century. Some of these challenges and opportunities are discussed here.

Multidisciplinary research in such areas as electronic commerce, digital government and intellectual property to increase understanding of the impact social, ethical, economic, political and legal factors have on the development of information technology and how information technology breakthroughs affects these fields. Addressing the importance of a more skilled American workforce, including educational materials that are reachable by individual learners and universally accessible for educating and training diverse populations, tools for lifelong learning in information technology, coordinated design of computers and training systems that would help people learn faster. Such would include building
an "electronic information exchange" that will allow every American to retrieve text, data, visual and other information in a wide range of subject areas. Today's digital libraries and data warehouses represent a key step in this direction, but are limited both in content and accessibility.

Digital libraries research seeks to dramatically advance the means to collect, store and organize information in digital forms, and make it available to be searched, retrieved and processed via global communication networks. Currently, the Universities of Michigan and Illinois, Carnegie Mellon, Stanford and the University of California at Berkeley and at Santa Barbara lead the digital library projects. All of this data would need to be protected from criminals.

Ultimately, the prevention of crimes against information property becomes confounded with the issue of individual privacy. Attempts to deter this sort of crime will also create struggles between governments and corporations over control of sensitive information. The interests of individuals are represented by the laws protecting individual rights and by the public administration of those laws. In our quest for the security of information property, it is important to keep in mind that people with a legitimate right to access the data involved commit the majority of the computer crime from which we want protection. Increasing government surveillance or a
fortress-like mentality for property protection has not been successful in the past as a solution to the law-and-order problem, however, considering the events of recent weeks, it would become easier to sell the public on the concept of government surveillance and/or a fortress-like mentality. The protection of computerized information requires a society that respects the information rights of individuals and corporations.

The ethical issues of computer use involve responsible decision-making by individuals, professional organizations, corporations, and political institutions. Computers do not automatically cause information to become property or to be controlled by a few decision-makers. If used for different purposes they can be the basis of public information systems and provide communications networks helpful for democratic discussion and debate. Predictions about the social future of information range from fears of widespread repression to visions of more individual freedom within democratic institutions. What actually occurs will be an outcome of our resolution of political issues now facing us.

Undoubtedly, the Internet represents what is potentially the most important economic and technological innovation of our time. It is certainly the most hyped innovation, with the Wall Street Journal, Financial Times, Economist, Business Week, and others reporting regularly on company strategies to use the
Internet and how this will change our lives. We have seen the first wave of how it would be used, the rise and fall of the dot-com companies. With both Moore’s Law and the law of Accelerating Returns at work, the dot-com companies emerged quickly and accelerated to a bubble point.

But considering the Internet innovation by itself, the Internet has already demonstrated its capability to increase economic efficiency by reducing search costs and giving consumers and business purchasers greater choices of products and stores. It has also shown how the "death of distance" could reduce local monopoly power and adds to the globalization of economies. It’s not certain yet what will replace the dot-com or the nature of the next wave of dot-com companies. What is certain is that as more and more commerce is transacted on the Internet, there will be two broad possibilities for organization of markets. The Internet could produce huge dominant monopolies - future Microsofts, or it could create the opportunity for many small, niche firms for whom the Internet will provide the number of purchasers needed for profitable operation. The issue hinges on the preferences and needs of consumers and businesses, the development of technologies to protect purchasers, and economies of scale, if any, in the Internet marketplace.
Summary and Conclusion

The preceding discussion has shown that information technology is completely, for better or for worse, revolutionizing the way we live - including the way we communicate, the way we define our communities, the way we do business, and the way we acquire knowledge. Expanded technological capabilities is creating an American culture in which data, information, and knowledge can be accessed from anywhere by almost anyone, and used for almost any purpose, good or bad.

The initial look at the history of information technology served to remind us that there is nothing fundamentally new in the lack of control and choice which individuals feel in responding to unrelenting technological development. History is in fact filled with accounts of individuals who fought, usually unsuccessfully, against the onslaught of misdirected technological "progress". Today, individuals and groups must engage in a difficult struggle with political leaders, international and local business interests, technologists, and educators to have their needs, desires, and opinions heard. The economic assessment of technological solutions must take into account social and environmental factors, even when they are difficult to quantify in a cost-benefit analysis. Engineers and scientists must assume greater moral responsibility to publicly
criticize inappropriate and misdirected technological developments such as the U.S. "Strategic Defense Initiative", or the substitution of human expertise by cost saving computer systems. Educators must help to foster both critical and creative facilities in students so that they are better equipped to make and articulate choices and assume effective control of new technologies.

One of the most strikingly obvious impacts of information technology is the shift in the work-home relationship. Many people today do not only take work home, but a lot of people telecommute (that is, work from home). Most people today have separate rooms for their computers and work-related papers. A large proportion of supposedly free time is spent thinking about work while in the shower, eating, or driving. Thus, information technologies have been instrumental in redefining the scope of work.

As the tools of such information technologies as the Internet, multi-media computers, virtual reality, and artificial intelligence mature, the implications of these technologies for our society still remain not well understood.
References


