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Community planning in the network society

J. Eric Ogle

To the Graduate Council:

I am submitting herewith a thesis written by J. Eric Ogle entitled "Community planning in the network society." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science in Planning, with a major in Planning.

Bruce E. Tonn, Major Professor

We have read this thesis and recommend its acceptance:

James A. Spencer, M. Mark Miller

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Interim Vice Provost and
Dean of The Graduate School

COMMUNITY PLANNING IN THE NETWORK SOCIETY

A Thesis
Presented for the
Master of Science in Planning Degree
The University of Tennessee, Knoxville

J. Eric Ogle
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DEDICATION

To Jayne Ogle, my wife, my travel companion, and my best friend.

Your constant determination to settle for nothing less than the best for our marriage has allowed my dream of a graduate degree to be realized. You are the consummate teammate for life, fully understanding of the meaning of short-term sacrifice for long-term benefit. There will be a tomorrow, and thanks to you, our lives together will be much better prepared for any obstacles we may encounter. It is because of your unselfish support and unending dedication to me during my graduate studies that the product of such support I most appreciatively dedicate to you.

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ABSTRACT

Models of social change have yet to emerge that deal with planning for change at the local community level due to the growth of public network, the Internet. The interactive network is changing the way people live, the way people earn a living, and perhaps more importantly, the way people spend their leisure time. The understanding of the impacts such technological diffusion plays in sustaining the social capital of the smaller communities of America will be of importance to developers of public networks and planners of the local and regional communities.

This thesis discusses major trends that will shape the future of social participation in smaller American communities. The thesis will lead a discussion of the history of technological diffusion in society and will focus on the acceptance of advanced means of communication and information processing within various forms of social groups. After such discussion, a proposed Human/Network Interface (HuNI) model will provide a structure for the evolving roles of social groups with regard to the increasing pervasiveness of advanced network communications. Using the HuNI model as a framework, the thesis will conclude with a discussion of practical implications for planners concerning the influence the Internet will have on smaller communities.

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INTRODUCTION

The Planning profession draws from many sources of information and knowledge to help place perspective on humans and their fundamental social requirements and gathering patterns. Since the beginning of human time, human beings have gathered in groups to rely on interpersonal bonds of commitment to meet shared needs of food, shelter, protection, education, and belonging, among others. No matter the level of civilization one looks to in the past, the share of information has been an essential action of human development.

The social groups we live in, the services we require, and the exchanges we make with other individuals are necessary to sustain the social groups we belong. This interdependency give rise to community – the phenomenon often defined as a group of people having common rights, possessions, work, and interests. Community involves relationships of material and information flows among a group of people to create a sense of belonging and enjoyment from the physical and informational boundaries shared.

Now a new communications technology – the Internet – is shaping American neighborhoods, societies, and cultures. The communications and information-processing systems of tomorrow will be a ubiquitous network that will allow people to communicate with people, machines to communicate with machines, and people to communicate with machines. Today such technology is being diffused into society through network interface devices such as the cellular telephone and desktop computers, but in the near

future will include handheld computers and televisions. Even more, miniaturization will allow the pervasiveness of computer networks to be in places once considered undeserving of typical computer networks, such as in household appliances, the automobile, and even sewn into wearable garments.

The effect of such connectivity "is too recent a social phenomenon to have provided the opportunity for scholarly research to reach firm conclusions on its social meaning."[1] But through research guided by the scenario building process detailed by Peter Schwartz in *The Art of the Long View*, this thesis will construct a discussion of key driving forces that will influence the American community with respect to increasing information technology. The discussion of the research, which will be presented as driving forces throughout the first three chapters of this thesis, will uncover the predetermined elements, critical uncertainties, and pivotal elements of information technology's increasing role in American businesses, workplaces, communities, homes, and lifestyles.

Planning organizations can benefit from the scenario process because the discovery of such building blocks encourages strategic conversation about key decisions and priorities. Companies and organizations that have instilled the scenario process and strategic conversations "in their deliberations have managed to anticipate difficult times and opportunities that have caught managers of other organizations unaware."[2] The discovery of trends and the discussion of plausible outcomes are perhaps the most valuable products of strategic conversations. Such conversations lend themselves to the realization of periphery items that may influence trends discovered through applying a longer view.

Such strategic conversations in this thesis will postulate the emergence of a new model of social interaction due to the increase of information processing in the traditional social group. The Living Systems model, which is the principal model for social interaction, separates the required functions of social groups into nineteen interdependent subsystems. Interesting is the fact that 47.4 percent of social interactions in social groups require the processing of only information. What this human replacement means to society will be discussed in Chapter Four with the introduction of a Human/Network Interface (HuNI) model. The HuNI model merges the idea of the Living Systems model with the growing pervasiveness of the Internet, as presented with the current OSI Model for computer networking.

What this new model of social interaction will mean to the future of community and civic participation will be presented in Chapter Five. The chapter will present the trends of civic participation and imminent loss of culture as implications for planners of community. The chapter will suggest that planners build community and culture through the network as a means of grounding community members to physical community in fostering new civic engagement with a sense of place that will rise in importance as people begin building community through virtual bonds of connectivity. The chapter also presents two useful tools for the planner to use in the local community. The prioritization matrix, which can be used rank importance for qualitative information, and briefly explains the scenario, which helps give qualitative, story-like characteristics to often quantitative information.

The thesis will end with a conclusion that calls for planners to build social capital in the physical community and not strive merely to sustain social participation, but actually work to increase social capital through the network. The challenge for the community planner should be to develop a positive awareness of technology in order to diffuse innovation among the members of the community as a means to improve their lifestyle, protect the local culture, and increase the social capital of the community. However, before a discussion can be made of future trends and where community is heading, we must first appreciate the history of technological diffusion and recognize the value of how community and social participation have progressed through the discovery and social diffusion of technology. The first chapter will offer such hindsight.

CHAPTER 1

TECHNOLOGICAL DIFFUSION INTO SOCIETY

1.1. Early Technological Advancements

The passage of time has always been marked by technological innovations of society to make lives of its citizens easier and the functions of its communities more productive. During the Stone Age, almost two and one-half million years ago, when stone tools consisted of nothing more than shards of rock taken from larger rocks, the productive capacity of man first began to increase. Instead of ten people in the village going out for meat and berries every day, only eight group members needed to go on the hunt because eventually the tools had increased the productive capacity of the tribe. Extra people in the tribe were then expendable to do other tasks, like care for the young, cook food, and discover how to better utilize materials extracted from the earth.

So came fire, but not just as a beneficial wonder of man, but for the productive capacities of communities. With fire, people soon discovered that by melting pieces of the earth, as with copper and tin in the Bronze Age, members of the community could fashion tools to reach higher on the fruit tree, stab an animal instead of patiently waiting to catch it, and provide items such as pots and jewelry to the community's surplus inventory. When inventories finally grew to the levels beyond the community's consumption, the tribe possibly traveled down river or over the mountain to barter for objects that each tribe had produced that the other tribe needed. "Bad year for corn? Here, we will trade your tribe

some of our corn in exchange for your fish," may have been the conversational seeds that eventually led to today's growing global market economy. "After all, the earliest form of writing, Mesopotamian cuneiform, started out about 5,300 years ago as a technology for keeping track of business transactions."[3] Intercultural communication induced by trade had begun.

Physiologist Jared Diamond discusses the events alluded to above in his Pulitzer Prize winning work, *Guns, Germs, and Steel.* While obviously not in the context of this writing to detail the technological achievements since the last Ice Age, the social aspects of work and community as related to the diffusion of technology has a constantly evolving impact on society.

An interesting point to realize is that most societies borrow technology from other societies and that most technology very seldom developed locally.[4] Early innovations such as plant domestication and pottery were created by as many as nine separate local societies; however, the wheel, pulley, metallurgy, magnetic compass, windmill and other innovations rose only once in world history. Such complex innovations were usually acquired by borrowing, because they spread more rapidly than they could be independently developed locally.

When a useful invention did crop up in one society, the diffusion was in either one of two ways. "One way is that other societies see or learn of the invention, are receptive to it, and adopt it. The second is that societies lacking the invention find themselves at a

disadvantage vis-à-vis the inventing society, and they become overwhelmed and replaced if the disadvantage is sufficiently great."[5] When societies do adopt a new technology from the society that invented it, the diffusion may occur in many different contexts. Diamond mentions several outcomes that may ensue: "Peaceful trade (as in the spread of transistors from the United States to Japan in 1954), espionage (the smuggling of silkworms from Southeast Asia to the Mideast in 552), emigration (the spread of French glass and clothing manufacturing techniques over Europe by 200,000 Huguenots expelled from France in 1685), and war."[6]

Some aggressive tribes in the past have taken a lesser tribe's metal, the tribe's domesticated production animals, some of the tribe's people, or even the tribe's rights to oil, which has led to bitter conflicts that drain the natural and productive resources of each of the battling tribes. Times of war are particularly sensitive times for diffusion of technology as a societal unit, and often the pressure to develop technology leads to periods of great experimentation and technological growth no matter the cost. Of course, the word cost is used broadly because times of rapid experimentation have led to great changes to the environment, to science, to economies, and to humankind. However, it is because of those costs that we owe our existence today.

1.2. The Era of Rapid Technological Diffusion

In considering important innovations between 1900 and 2000, a PBS television program highlighted a year in the life of America at the dawn of the 20th Century. During the television show, one of the commentators relayed a notion from an early 20th Century U.S. Patent Office director who said, in essence, that by the early 1900s everything that could be invented had already been.[7] In the same program, a modern-day entertainer and writer whose specialty is American life and music at the turn of the 20th Century said, "The turn of the century...represented a period that will someday be compared to the Renaissance. Within a period of very short time, 15-20 years, most of the breakthroughs in technology occurred that now influence our lives so heavily. Everything since then has been engineering."[8]

There is a reasonable argument that this is true for the examples the show examined. The automobile, the highway system, airplanes, rockets, telephones, and maybe even the television all could be just additional engineering on prototypes that existed early in the 20th Century. However, a technology that has made recent inroads where there are no discernable early 1900s roots is perhaps the field of data networking, in particular the ability of computers to talk to other computers over data networks. Perhaps the programmable mechanisms were conceptualized as an aid to assist with repetitive functions like weaving cloth and charting stars, but certainly not complex mathematical calculations instantaneously dependent upon remote inputs. Computer and data

networking industries are reshaping our lives at least as much as any other technological impact has done, and its future impact will be difficult to predict.

Regardless of the time of conceptualization, the technological advances of the past half-century have brought profound changes in the very nature of time, or at least our perception of time. In fact, the very character of reality has been transformed as we find our daily experiences of the world, and of each other, being mediated more and more by growing networks and advancements in communications technologies. Our increasingly mediated existence blurs the boundary between reality and non-reality. This is apparent among children playing video games and even less obvious among adults watching the evening news.[9]

The summation of innovation diffusion throughout history is mentioned because the premise of this thesis is that the innovation of network computing will be so beneficial to humans that there will be a rapid diffusion of networking technologies in the very near future. As illustrated in this chapter, certain periods of time throughout the earth's history have seen hundreds of thousands of years pass with no discernable change in tools or technology. "Today, technology advances so rapidly that it is reported in the daily newspaper."[10]

1.3. All Roads Lead to the Information Highway

Throughout the various ages of humankind's civilization of earth, innovations have built on the technological advances of the previous age. No subsequent age has ever been able to fully disinherit the technological characteristics of the previous age. People will always need to eat, but because people are so much better at reproducing and harvesting plants, less people are required to farm. While the Industrial Age brought the machines that powered the subsequent eras, less employment is now required in industrial environments because of the increased efficiencies that machines and other technologies have provided; the same can generally be said of the Production Age and of the post-Production Age.

Just as the elevator allowed buildings to practically exist over seven stories tall, the telephone allowed businesses to stash the productive capacity of the telephone into a small cubicle on the top floor of some far off building. The revenue-increasing act essentially removed the necessity of face-to-face contact, and thereby removed the barriers to business interaction that distance previously imposed. Because of increased transportation and planning tools, the post-Production Age has replaced mass production with customization and just-in-time production schedules. Manufacturers are now working smarter instead of harder. Even before the overwhelming appearance of the Internet, communications technologies were making inroads to make people's lives easier and more productive.

In 1967, Herman Kahn and Anthony Wiener speculated in *The Year 2000* that cybernetic[a] systems would "automate systems so as basically to eliminate the role of man as a supervisor and use him only as a monitor who can, if necessary, override the system."[11] Of course, in 1967, the stalwarts of heavy industry were in their dying days. The Wall Street Journal wrote on September 16, 1966, that, "limited automation in the steel industry is estimated to have eliminated 80,000 out of 600,000 in the industry between 1953 and 1966, with a minimum of 100,000 more job losses estimated for the next decade."[12]

How true those editors were when they wrote that "if the middle third of the twentieth century is known as the nuclear era, and past times have been known as the age of steam, iron, power, or the automobile, then the next thirty-three years may well be known as the age of electronics, computers, automation, cybernation[b], data processing, or some related idea."[13] It bears mentioning that every notion of their assumptions were correct before the year 2000 except for cybernation. At the time of their assumptions, the power of the single task computer, the programmable robot, was being developed to replace mundane or hazardous human functions. The power of the computer as a working, artificially thinking, human replacement has yet to come of age; however, recent trends in network computing may prove their assumptions are not very far away.

[a] The comparative study of human and machine processes in order to understand their similarities and differences. It often refers to machines that imitate human behavior. The term was coined by Norbert Wiener (1894-1964), one of the great mathematicians of the 20th Century.
[b] The automatic control of a process or operation by means of computers.

How far off remains to be seen, but estimating the time when computers can achieve the memory capacity and processing capabilities of the human brain could occur by around the year 2020. "Human intelligence remains far more supple and flexible," as Ray Kurzweil writes in his book *The Age of Spiritual Machines*. He continues, "Computers are still unable to describe the objects on a crowded kitchen table, write a summary of a movie, tie a pair of shoelaces, tell the difference between a dog and a cat, recognize humor, or perform subtle tasks in which their human creators excel."[14] Kurzweil says that our most advanced computers are still simpler than the human brain – currently a million times simpler, "but this disparity will not remain the case as we go through the early part of the 21st Century."

So, in the end, the authors of *The Year 2000* were only twenty or so years off in their predictions of life at the turn of the 21st Century. Still yet, the thought processes were headed in the right direction as most people in 1967 were just beginning to understand the power of a single computer. Now, most people consider their computer useless if not connected to another computer. The once unfamiliar act of connecting a computer to a telephone line has now become part of the daily routine for millions of Americans, and that joining of computers to create a network of computers has brought us to the doorstep of the Information Age.

At the closing of this first chapter, after taking into account the advancements made by humankind, an initial safe assumption can be made that technology does not determine society; technology embodies society. Nor does society determine technological

innovation; society uses technology. This point of view illustrates that society simply uses technology that society itself has helped create, by building on previous advancements, and making the productive life of humans more efficient and improving the quality of life for society. However, as will be presented in the next two chapters, society has become more dependent upon technology than at any another time in the history of the earth. Because of this increased dependency, humans and their patterns of social interaction are most certainly destined to change. The next chapter will delve into the current standing of technology and will lay the groundwork for what such advancing technologies will mean for American business with the mass appeal of ubiquitous, network connectivity.

CHAPTER 2

BUSINESS, INDUSTRY, AND EMPLOYMENT

2.1. Drivers of Social Change

Technology, much like all the other tools at our disposal – money, guns, fossil fuels, automobiles, software, hardware, and all the rest – have potential for good or evil. Our use of these inanimate objects brings about both rewards and retributions. Therefore, "technology does not determine society. Nor does society script the course of technological change, since many factors, including individual inventiveness and entrepreneurial spirit, intervene in the process of scientific discovery, technological innovation, and social application so that the final outcome depends on a complex pattern of interaction."[15]

Moore's Law, a law considered the basis for many planners' technological forecasts, says that the personal computer's performance will double every eighteen months for the next 200 years.[16] The device considered a personal computer when Gordon Moore developed his law back in 1965 is now evolving to smaller and smaller devices with ever-increasing power. Therefore, not only is computer performance and human productivity growing, miniaturization is occurring as well which will give people the ability to perform computing tasks from places other than from sitting behind a desktop computer. As people become more productive in non-traditional locales throughout non-traditional hours of the day, productivity and surplus will increase at a relative amount, which

creates economic growth. Such productivity through increased technology becomes a function of technological change.[17] Therefore, it is important to realize that the diffusion characteristics of society become the crucial driving forces underlying economic growth and technological impact on both the economy and society.

The previous chapter looked at the history of technological innovation and its diffusion into society, and looked at events and trends that shaped the America that we know today. Building on the premise that technology is changing the societies we live in, this chapter will examine the driving forces for changes being made in several aspects of the factors of production, due in large part to advancements in information technologies. This chapter will present current trends in computer networking throughout the enterprise and will illustrate the affects such growing information networks will have on American business, employment, aging populations, and vocation-centered social systems. Important drivers of change will be discussed through several sections to provide an overview of future business requirements, future workplace demands, and the new employee.

2.2. Corporations

The corporate enterprise will be the first entity to experience widespread change in culture and philosophy due to technological innovation. After all, for consumers to be able to use a product, corporate marketing must either identify an existing need in the marketplace or create a need through marketing channels. Therefore, the business

environment will first group to experience the luxuries and tribulations of the Information Age before trickling products down to the consumer where they will then begin to have an impact on society in shrink-wrapped and pre-packaged targeted niches.

The changing requirements for a successful business in the Information Age is much like the transition between all previous ages. Old concepts and strategies do not work because new era businesses require different business models to give them the most flexibility within the current marketplace. "The American business is no longer focused on technology, it's focused on solving business problems, and technology is only one piece of the solution."[18]

2.2.1. The Intelligent Enterprise

Computers and networks were created by large organization in attempt to increase the productive capabilities of humans and organizations. Scientists and other "number crunchers" of the mid-1900s needed computers for numerical advancements in mathematical theory. Soon, letters of the alphabet were assigned to a string of numbers. An eight-character string of ones and zeros represented a letter. What was once a bit of information (one number represents one number) became a byte (eight numbers represents one letter) of information. With that, written information could be stored on computers. Later, with networking technologies, this written information could be sent from computer to computer. The work of one person increased the productive capacity of another person. Applications were developed to help automate and improve efficiencies

in the workplace. Researchers could now share projects to speed developments of varying significance. Businesses discovered the ability to customize applications and automate repetitive functions, and in doing so have found niche markets which have changed the market like never before.

Old economy organizations ignored the Internet at first, which allowed small startup organizations to move in and carve out their own niche. The latter part of the 1990s brought about sweeping developments in many industries, which gave way to the explosion of start-up companies most often characterized by the "dot-com" phenomenon. Then in mid-2000, the old economy companies responded with vigor in buying out the successful niche players and making them their own. As one writer most eloquently put it, "The dinosaurs may be coming to the Internet party late, but they are dressed to kill."[19] This lesson may be worthwhile to remember in the future, as organizations with the resources to take advantage of technology will do so with the bottom line in mind, and may not explore new territory or take on risky niches that only small organizations are nimble enough to manage with success.

In fact, as the distinctions between the Old Economy and the new Network Economy fade, what was once the first-mover advantage is now shifting to capital-laden larger companies. In most cases, such a change may mean nothing more than a simple marketing ploy or a shiny new "dot-com" name. Is Charles Schwab, for instance, a financial stalwart of the Old Economy or a nimble web-savvy Network Economy powerhouse? James Daly, Editor of Business 2.0, says it is both. "Early lessons have

been learned and now brand awareness, assets, and customer relationships matter more than ever. The race is no longer to attract early adopters, but to win-over long-term mainstream customers who want quality and service."[20]

Despite the suggestion that technology is developed to solve particular problems, the Network Economy is based on technology, but it is built around transformation. Today corporations wrestle with integration of various functions to create processes that range well beyond the confines of what is needed to solve single tasks of a single department. Despite bullish or bearish stock market swings, the late 1990s and early 2000s brought an economic revolution of epic proportions, comparable only to the earlier transitions that changed hunting to farming, and later changed farming to industrialization. "Not surprising is the fact that when there is a stock market boom, high tech get the biggest boost, because manufacturers, distributors, and retailers tend to have more money to spend on computers, software, networks, and automation. Likewise, when there is a pullback, tech gets hammered first and hardest as companies scale back or eliminate such purchases."[21] The stock market decline of 2000 should not be construed to mean that we are not beginning a profound transformation in the way societies create wealth.

In the Information Age, production levels are measured by the knowledge capacities of the firm. Knowledge of consumer habits, knowledge of industry trends, knowledge of the market, knowledge of technology and other mission critical information are essential for the success of any size organization. Because information can now be easily obtained through the network, the right knowledge base and the proper market focus will allow

resourceful organizations with an understanding of the power of the network to challenge entire industries that were once considered infallible.

However, the bottom line is getting harder to quantify as new forms of capital are being raised to heightened levels of importance. Three forms of capital in particular, intellectual, human, and structural are intangible and difficult to measure, but are becoming the real engines of profit in today's economy. Briefly, "intellectual capital is the brain power of the organization, codified and put into explicit, transferable form like a piece of software or a document. Human capital is the value of workers' relationships and the tacit knowledge. Structural capital is the experience and expertise of the organization embedded in processes, polices, and systems."[22]

"Successful organizations are those able to generate knowledge and process information efficiently. The network enterprise fits that bill by transforming signals into commodities by processing knowledge."[23] Forward-looking enterprises are currently building digital transport highways among their departments to unify corporate information. At the same time, many smaller businesses are building highways among each other, often with strategic, application powered hubs at their intersection, as seen with the rapid proliferation of first generation business-to-business (B2B) exchanges.[a] Networking technologies have allowed businesses to find new business customers and new suppliers through the network. Through these netmarkets, businesses can locate and communicate with industry-specific partners, customers, or suppliers in virtually every conceivable

[a] Refers to one business selling to another business via the network; hence, business-to-business, or B2B.

industry.[a] Forrester Research says that 70 percent of corporations expect to conduct at least a quarter of their trade via B2B marketplaces by 2005, while 80 percent expect to take a stake in more than one exchange.[24] According to the Garnet Group, B2B e-commerce is expected to grow from $145 billion in 2000 to more than $7 trillion by 2004, which will represent more than seven percent of all sales transactions worldwide. If those estimates prove to be true, Manuel Castells will be correct in predicting "inside the network, new possibilities are relentlessly created. Outside the network, survival is increasingly difficult."[25]

2.2.2. From Corporations to Outsourced Partners

The Network Age is giving people the tools and machines to build personal surplus by removing the distance barriers, and to a large extent remove the person-to-person contact through communication networks, which had been the driving force of the market economy. Barring catastrophic disruptions, the market economy is not going to change any time in the near future. The market economy is beginning to take over the world through the magnetic forces of globalization, and countries all over the world are drawn by its power each year.

While some people think that computing and networking is just a great new outlet for marketing buzzwords, Tom Steinart-Threlkeld of Internet Week confirms that the Internet is not just a passing fad. He says the Internet "is a long-term phenomenon that

[a] As of May 2001, there are over 4,000 netmarket players in over 40 applicable industries: www.netmarketmakers.com/kb

will go through many metamorphoses. So far, it's been about communicating – chat, discussions, email; in the future, it will be about action."[26]

In some industries, customer service jobs will be eliminated as the network will let customers "talk" directly to software and network applications for completing the tasks that need to be performed. As more human-input tasks are slashed in favor of increasingly ambiguous client "self-serve" data transactions, the network economy will give way to individualized employment opportunities, specifically service-type employment, where individuals will depend on the network for finding localized, physical employment, quite often on a contract or "as needed" basis. In fact, the future corporation may take on characteristics of the network itself. The power will remain at a command and control center, but the knowledge will be spread throughout small pockets of outsourced partners under close management by the corporate headquarters.

Even the federal government is beginning to outsource management of Information Technology (IT) projects, particularly because of problems government agencies have in hiring skilled technology workers and in keeping abreast of new technologies. NASA has outsourced management of about half of its desktop computers, totaling some 44,000 PCs and Macintosh systems. The new Bush administration is looking to outsource as much as half of federal civilian IT services, which account for approximately $44 billion in federal spending.[27] Adding to the problem, half of the 70,000 IT workers on the U.S. payroll will become eligible for retirement in the next five years, and rising IT salaries nationwide are creating recruiting problems for government agencies as they look to hire additional IT

workers. Don Tapscott says we "should examine government's core rationale not to proclaim the end of government, but to discover possible new roles and forms."[28] Just as the Internet enables new private-sector business models, it also enables new ways of delivering government functions, so like the corporate environment, the goal needs to be the delivery of better value to the citizens at a lower cost. Considering the fact that President Bush previously governed a state that outsourced over a third of its IT needs, the trend for government outsourcing is growing – but not only in the government sector.

In closing the discussion of business trends, the following sections will look at the five main services that are increasingly being outsourced by leading corporations and organizations of every size. As mentioned earlier, the Information Age is characterized by the production of knowledge, yet for various reasons firms have not fully developed their in-house knowledge management programs. Therefore, completely new service industries are growing to aid in providing businesses with adequate information, and are becoming industries in their own right. The following information and knowledge management services represent newly evolved industries that provide outsourced knowledge production for businesses which are trying to capitalize on knowledge to improve the operations and profitability of their business.

2.2.2.1. Knowledge Management

A basic Knowledge Management program begins with the acquisition of information, from outside and from within, and with the formulation of a sound strategy for storing,

organizing, and implementing change based on the results of the analysis. In a sense, Knowledge Management is the total management of any information service provided to the firm. However, few firms have the resources to implement entire Knowledge Management programs in-house. Therefore, a firm's entire Knowledge Management program is often outsourced as well. However, the long-term evolution of Knowledge Management will lead to in-house management of information gathering and processing.

Whether outsourced or performed in-house, a successful Knowledge Management system encompasses the flow of information throughout the business in a way that creates a benefit to overall knowledge generation and implementation. To be successful, companies must treat knowledge as an explicit business concern. Therefore, a Knowledge Management framework must be reflected in organizational strategy, policy, and practice at all levels of the organization for complete immersion of information distribution and feedback systems.

By building on each piece of information from the following information tools, proper action based on that knowledge can be applied to the firm's strategic planning process to deliver higher quality products and services to the customers' evolving needs.

2.2.2.2. Application Service Providers

There are several different definitions and interpretations of the Application Service Provider (ASP). The most common definition, until recently, is a "company that offers

individuals or enterprises access to application programs and related services over the Internet or Intranet[a] that would otherwise have to located on the enterprise computers."[29]

Now, ASPs are third-party service companies that host software and provide the remote application of the software for the firm. In the corporate world, the ASP will handle the IT department's support functions. Most items such as helpdesk, virus protection, setting up new employees, distribution of software upgrades will be outsourced to an ASP. "The basic value of an ASP-type service company is to leverage the volume efficiencies made possible by serving many companies in one vertical market."[30] In other words, the ASP will perform the same service for many different corporations, such as payroll. Other ASPs will manage the entire computing needs for an organization from PCs, printers, network access, and software. The ASP will install it, troubleshoot it, and support it, and all the firm has to do is write the check each month.

A typical customer of an ASP is a Fortune 1000 company following a traditional (non-information age) business model. However, over the last several years the Fortune 1000 firm has become more and more dependant on software to run operations. The management and performance of current IT functions have become burdensome for the IT department's staff and budget. An ASP is contracted to lift the burden and manage the firm's software in the new business environment. With the ASP model, software is treated as a service, and all customization, maintenance and delivery over networks is handled by the ASP and lets the firm return to its core business operations.

[a] An Intranet is a network created by only computers and users within the organization's network. Often this network is excluded from the public Internet so that only authorized organizational users have access.

ASP services are an important alternative, especially for smaller companies with low budgets for IT, or small companies without IT personnel on staff. Simply put, the ASP is a general contractor acting as technology integrator, or someone who is paid to pull everything network related together and make e-business work.

2.2.2.3. Enterprise Resource Planning

The Enterprise Resource Planning (ERP) system is the electronic entryway, so to speak, of an organization that is fully integrated as an e-business. The ERP is often integrated within a firm's Intranet and information is made available only within the company and with secured partners. The ERP system is the nerve center for many integrated operations of the firm. For instance, all suppliers and business partners interact through the ERP system of an organization. The ERP system is responsible for churning out back-office operations like finance, payroll, inventory, procurement, and human resources. In addition, the ERP keeps count of corporate debits and credits, and stores non-personal employee information for planning purposes. A complete ERP solution simplifies supply chain activities from Original Equipment Manufacturers (OEM) and for Value Added Resellers (VAR) of the firm's products.

The information sent through the ERP system is quite bi-directional, as the system grants permission for accessing specific information from partner firms. Because the ERP system is the central hub of the organization, most of the other electronic functions in this

section are integrated with the ERP functions to insure the overall efficient operation of the firm. Because ERP functions can now be outsourced to firms that specialize in ERP customizations, even smaller companies have the tools to compete with more IT savvy firms.

ERP is a way of figuring out how money should be spent, and is quite effective with the often politically sensitive task of alerting decision-makers of where costs can be cut. The ERP function is playing a part in wedging into the community created in the workplace. This is the ugly, but often necessary, side of ERP because politics is a powerful object to change in any organization, and is often a resistance to change altogether. Because ERP automates processes that span multiple departments within the organization, the use of this middleware application is highlighting the fiefdoms of excess often created by middle management.

2.2.2.4. Customer Relationship Management

Out of all the possible outsourced solutions that currently exist, Customer Relationship Management (CRM) has the potential to create the most activity for the corporation. The CRM system is the heart of the organization's strategic and tactical initiatives that gather and perform marketplace and customer analysis in real-time. Originally, CRM was mainly a tool to capture information about shoppers and analyze their click stream to help sales personnel generate sales leads and service requests. However, the latest CRM

applications go much farther, as evident in the fact that the CRM market reached $19.9 million in 2000.[31]

Using CRM systems, Internet-based businesses can respond to customer inquiries, more accurately predict customer behavior, identify buying trends, and find out the reasons for their marketing success and failures. "The faster you can collect and analyze data, the better position you're in to make the right offer to the right customer at the right time."[32] The marketing staff can use CRM data such as industry, pricing, and customer forecasts to adjust selling and purchasing strategies through dynamic pricing models. With the Internet, instead of using dynamic pricing as a tool to move excess inventory, it has questionably been used to boost profitability on unsuspecting return customers who are categorized into separate demographic categories. The system also let the organization launch tactical efforts, such as preferential treatment for selected customers or to assist users to boost sales.

Mixing CRM with the Internet will enable a firm's customer base to interact with each other. Business leaders will then be able to extract information from the exchange to make continuous improvements in product and service, and will be building community around their product in the process. However, CRM will really take off when mobile applications begin to surface. The McDonald's fast food restaurant chain will know you pass four of their stores everyday on your way to work.

2.2.2.5. Data Mining

Data Mining is partially a function of CRM in that the data is analytically applied to mathematical, and sometimes common-sense models to better understand buyer behavior. By extrapolating useful insights into market and customer behaviors, companies can adjust business rules and react to each of the firm's customers in a relevant, personalized manner. Although the concept hasn't changed since the days of the mom-and-pop grocer, today we conduct business with fewer face-to-face exchanges, so the process of understanding consumer needs has become more scientific.

Data Mining analytics provide comprehensive insight necessary for pinpointing revenue opportunities, enhancing sales channels, and mitigating cost risks. By providing meaningful insight into data, as well as transactional predictions, Data Mining enables firms to ensure that workflow are in step with customer demands. The difficulty is no longer in gathering data from customers but trying to make sense of the multitude of customer contact points coming into the firm from various network channels. "Data Mining offers predictive modeling of customer behavior, customer segmentation grouping, profitability analysis, what-if scenarios, and advertising campaign management, as well as customer personalization and monitoring."[33]

2.2.2.6. Business Intelligence

Business Intelligence (BI) solutions provide the in-depth analytical capabilities needed to turn raw mined data into actionable knowledge. As businesses worldwide recognize the strategic value of information, particularly web-based data, BI will become an integral part of an overall business strategy. "Regardless of whether [the firm] understands and accepts it, all organizations – dot-coms, manufacturers, retailers, distributors, or service organizations – have become "information" companies."[34] If the firm has a solid BI foundation, the firm will have a customer-centric data warehousing strategy, a clear analytic application focus, and an understanding of the asset value of its information and how to use that information to gain insight into the firm's business.

Firms also gain additional BI into how and where they are spending their dollars, along with quantifying supplier performance. This information offers buyers the ability to better manage their budges, monitor supply quality, and reduce unconventional buying. But through outsourcing BI, the firm can tap the Internet for information on competitors through third-party vendors that will supply the customized and filtered information to the decision-maker drawing from "any available data source, including market research, news feeds, or pages from a particular geographic location or realm of the Web, such as computer trade magazines or sports headlines."[35]

2.3. Workplace and Workforce Development

Over the last hundred years, workers have been leaving jobs that technology has taken away, leaving workers to look for other jobs that technology was creating. At the beginning of the 19th Century, machines were not around. However, around the middle of the century, Cyrus McCormick invented the reaper, John Deere the steel plow, and then the tractor. By 1875, the proportion of the national labor force in agriculture had decreased from around 75% to 50%; by 1900 a third, by 1940 to a fifth, today agriculture is about three percent of national employment.[36]

Technology changed the lives of people then, and technology continues to this day, perhaps at an ever-increasing pace. Between 1960 and 1990, output of manufactured goods of all kinds continued to rise, but the number of jobs needed to create that flow of production fell by half. During that same period, a third great sector was rising: service employment. This great sector is made up of teachers, lawyers, doctors, traffic cops, custodians, sales workers and the like. In 1870, there were maybe three million of such jobs, in 1990 nearly 90 million.[37]

2.3.1 Technology in the Workplace

There is a new economy, with the Internet at its heart. An economy is how goods and services are created, distributed, and consumed. Throughout the 20th century, most of this activity was based on the manufacturing corporation – vertically integrated as

devised by Henry Ford. The backbone of the industrial age corporation was built around an infrastructure that included the electric power grid, roads, railroad tracks, and the telephone.

Now there's a new infrastructure added to them - the Internet - that is lowering the costs of transactions and collaboration among people, firms, organizations, and other entities. A new platform of wealth-creation is developing, supplanting the individual corporation as the starting point for strategic thinking. It is a system of meshed entities - suppliers, distributors, service and infrastructure providers and customers - that use the Internet as the basis for business communications and transactions.

While the service sector is growing, it is not expected to absorb more than a fraction of the millions who will be eliminated in the next several decades in the wake of advances in the information and communications technology."[38] Most new economy leaders think manufacturing no longer matters, and that in a post-industrial, service-oriented economy, manufacturing jobs are an antiquated link to the past. Often overlooked, however, are the people who produce the physical goods that consumers and other businesses use every day.

2.3.2 Manufacturing in the United States

A glance at the United States manufacturing scene reveals that the once stalwart of the American economy is in the throes of change. Some of the change is a product of natural

economic revolution. The former United States Secretary of Labor, Robert Reich confirms, "Jobs are changing due to technology."[39] The nature of work is changing dramatically, "perhaps on a scale comparable only to the Industrial Revolution," says *State of the World 2000.* "Increasing international trade and investment and a new wave of automation are reshaping virtually every kind of human economic activity and speeding up the pace of change."[40] In fact, the U.S. Department of Commerce reports, "the weight of all U.S. exports, per weight of dollar value, dropped 50 percent" between 1995 and 2001, yet all other trends show increasing statistics in foreign export.[41] United States exporters are shipping a lot more product in bits and bytes rather than in physical material.

However, "it is unclear whether computers and microelectronics will render jobs more interesting or more stressful, whether they will entail jobs that are mostly routine tasks instead of requiring problem-solving skills that stimulate human creativity, and whether they will lead to a growing polarization of the work force between well-paid and poorly paid employees."[42] Just like the earlier revolution, where farm employment reductions led to a rise of industrial employment, this transformation brings with it a retuning process, as existing abilities, expertise, and proficiencies lose in value and importance, and perhaps status, as new skills and requirements rise in response to demand.

In the past, when new technologies have displaced workers in a given sector, new sectors have always emerged to absorb the displaced laborers. "For more than forty years, the service sector has been absorbing the job losses in the manufacturing industries.

Information technologies are beginning to make inroads in the service sector itself, raising productivity and displacing labor across the entire expanse of service-related industries."[43] Today, all three of the traditional sectors of the economy – agriculture, manufacturing, and services – are experiencing technological displacement, reducing the need for low-skill, repetitive tasks. The only new sector emerging is the knowledge sector, made up of a small elite of entrepreneurs, scientists, technicians, computer programmers, professionals, educators, and consultants.

The manufacturing sector is changing in America, and trends indicate that fewer people are moving into skilled labor positions in manufacturing out of high school. The Manufacturers' Association of South Central Pennsylvania polled 335 high-school students in York County (where there are more manufacturing job that anywhere else in the state) and discovered that 90 percent, or 300 of those polled, said they would not work in a manufacturing setting. They gave reasons as being the work environment, the hard physical labor involved, low wages, undesirable hours, and lack of opportunity for advancement. The most telling sign of social impressionability was that when asked how they would feel at their ten-year high school reunion to be employed in manufacturing, 121 said they would feel unsuccessful, and 93 said they would be embarrassed.[44]

Despite the state of manufacturing, the National Tooling and Machining Association estimates a shortage of 25,000 to 30,000 skilled manufacturers in the United States – a number that is expected to increase because the average age of such worker is nearing fifty years old.[45] Segal's *Aging of Aquarius* estimates that by 2005 over half of the U.S.

workforce will be 41 or older.[46] Even more striking is that traditional manufacturing industries – automotive, steel, metals, and the like – the aging workforce is an issue today because over 50 percent of the workers in those industries are already 46 and older. Over half of them will reach retirement before 2010.

As discussed in the next section, traditional manufacturing jobs are shifting to specialized functions due to changing technologies. Manufacturing in the new economy is driven by the new prominence of the customer. The customer is king, and even manufacturers need to realize that in e-business, the king has far more power, and providing satisfaction requires much greater responsiveness and specialization from the production floor. Simply taking orders from the Internet and overlaying some Internet technology in the production facility is not enough. "Strategic errors are made if the presumption is that the business impact of the Internet stops with buying raw material, collaborating with business partners, and delivering customer products and services."[47] Internet commerce is really about connecting more closely with every other component of the business, including the supply chain, distribution channels, the sales floor, and all operations across the enterprise, including the plant floor. "Manufacturers need systems that can reveal available capacity, status of orders, and quality of product – not just after it comes off the assembly line, but while it is in process."[48]

2.3.3 New Economy Industries

Industry by industry, business webs are eclipsing the old model of the corporation. Smart companies are using the Internet to achieve goals they have striven toward for the past 25 years: focus on core competencies, reduce transaction costs, innovate more effectively, and gain new ways to deepen customer relationships. This is giving rise to new business models that are much more effective than those of the aging industrial age corporations.

In the future, more and more manufacturing companies will have to move to a make-to-order business model. That will force a fundamental shift in the way that manufacturing companies look at the manufacturing process. This means business-to-business competition will evolve into supply chain versus supply chain, as logistics and transportation services are prime targets in manufacturing organizations that are implementing "just in time" production schedules to adapt to their customers' ever-changing demands.

Growing logistics examples abound, such as Federal Express, United Parcel Service, and United States Postal Service are companies born for the network economy. All of these service-oriented companies simply deliver parcels from point A to B, a service that predates Marco Polo. Nevertheless, these companies have become the backbone of the New Economy, having redesigned its business processes based on the Internet. More than 80 percent of FedEx's shipments are ordered, tracked, and managed via the Internet,[49] and the company is using the Internet to deeply integrate its logistics expertise into the

business processes of other leading firms as well. Companies such as Enron, Schwab, Herman Miller, Cisco, Nortel, Gartner, and Dell are using business web architecture to outpace their competition by outsourcing their transportation needs – by weaving the web of logistics into their core business – so that distribution is almost automatic for them.

Not only new logistics-based organizations, but entrenched industries such as corporate banking are turning upside down, as new forms of money and person-to-person payment systems, like PayPal, proliferate. Companies like this are becoming the new financial intermediaries between customers and bankers, brokers and insurers, and suppliers and producers. Customers will soon be accustomed to this full customization and immediate gratification. Customers are not going to settle for the car that happens to be on the lot; they want a new vehicle built to their specifications and delivered within a few days. Manufacturing firms need to change their culture and their technology, and add new partners to tackle these challenges. Modern technology makes it easier for consumers to make better deals and switch to them instantly. Companies are in overdrive because the competition for consumer business is stifling. A growing business means that workers are working longer and harder days. Longer hours at work, spending evenings away from home.

In San Jose, California – the heart of Silicon Valley – manufacturing accounts for 22 percent of the metropolitan area's economy, and employees there are almost twice as productive as workers in other parts of the United States.[50] In fact, workers there added $124,055 in value to manufactured goods, nearly 70 percent more than the $73,217

average for manufacturing workers nationwide. Also amazing is that in the smaller city of Tulsa, Oklahoma, Williams Petroleum added technology to their core business and came up with a way to generate revenue from defunct gasoline pipelines. When Williams Petroleum shoved fiber optic cables into their old pipelines, they transformed into one of the nation's largest providers of communications. Tulsa is now a fast-growing telecommunications center, and Williams expects its workforce to double to 4,000 by the end of 2002.[51]

As illustrated by the examples above, change is being forced upon communities as companies try to create new wealth. Indeed, what is happening in communities across in the United States is what is happening to the American economy as a whole. The change is not simply old economy versus new economy. Rather "the U.S. economy is being redefined, refocused, and rejuvenated with an intensity that stuns even manufacturing executives with a sure knowledge of American business history."[52] In the meantime, globalization has evolved from scholarly banter to cliché. Nations – particularly the United States, but others as well – have lowered taxes and deregulated industries. Labor unions have continued to fade, as capital and jobs flow across borders at unprecedented rates.[53] Many businesses expect this trend to continue infinitely, globalization is not just the Westernization, or Americanization of the world, it is a redistribution of resources centered on profit making.

However, large employers are still drivers of change in metro areas and some are taking the initiative in helping bridge the digital divide. In 2000, Ford Motor Company

distributed free computers and offered Internet access for $5 per month to all employees to teach them how to use computers and the Internet, "which are increasingly becoming a part of all jobs."[54] By doing this, Ford quickly boosted computer usage is the Detroit metro area. Now more than half of all Detroit households claim at least one computer, compared with only 44 percent in New York City. The person responsible for distributing personal computers in a similar incentive program at Delta Airlines said, "the Internet is the way businesses will interact in the future. It's very important that our employees are educated and understand how the Internet works."[55]

In the business world, the Internet has been about empowerment, personalization, rapid information exchange, getting goods and services on demand, reducing costs, improving the time to consumer, moving inventory, and a host of other efficiencies. The Internet will always be about those things because business needs the value that the Internet provides. In the end however, the only thing the Internet is about is moving digital data at a low cost. It is no longer possible to imagine that amazon.com and aabra-kadaabra.com are in the same business because they both sell books over the Internet, or that yahoo.com and hellspice.com are similar businesses because they both end in ".com." Soon, we will be left with a world where an online bookstore is simply a bookstore, and a car company that buys material over the Internet is simply a car company. The Internet is going away like the phone went away, permeating everything, and in the process, becoming invisible.[56]

2.3.4 Employment at Your Service

As evident in many suburban and rural centers similar to those in east Tennessee, the post-industrial era has brought on new service positions in the occupational structure. This new occupational structure dictates that as we move into a more information-based society we will observe an increasing importance of managerial, professional, technical, and service positions, as well as a swelling in the numbers of clerical and sales workers.

This new economy will be void of many of the heavy industrial and manufacturing activities thought to be non-technical and not very "environmentally friendly" as prominent in the production eras of the past. However, not all jobs will be based in technology, as there will be a growing importance of semi-skilled occupations serving counterpart to the growth of professional jobs. For example, it has long been an assumption that people who work in information technology must be engineers or computer scientists. While it is certainly in the company's best interests to hire the very best people, companies should look beyond that small pool to the workforce at large. While networking technology is providing the pipelines for the new economy, it does not take a four-year college degree to manage a Cisco router or a Solaris server. All it takes is for the employee to possess a desire to learn a new skill while being trained. By creating new training sources, companies not only broaden their hiring base, but also free up engineers for work that requires their levels of expertise.

The new economy will continue to show a diversification and specialization of the service industry. Instead of service industries falling into lump service categories, separation of the service industry can insure adequate attention is addressed to each critical subsection. In order to make best use of the existing resources, future local and regional business and workforce development plans should focus around supplying a foundation for service industries in the four diversified areas:[57]

1. *Producer services*: provider of information and support; increases productivity and efficiency of firms. These businesses are job-shops and contractors involved in outsourcing activities from larger businesses. Such transactions are centered on business-to-business arrangements. This subsection entails printing services, janitorial workers, temporary workers, and other support-type functions.
2. *Distributive services*: transportation and communication; wholesale and retail trade. Provides support for the most critical of all elements in the network economy: bridging the gaps of time and space. People will move less for work; work will move to the people.
3. *Personal services*: characterizes the informational society. As progress is made to the economic development portion of the plan, personal services will emerge to fill the gaps as demand emerges. Such businesses typical of this sector are restaurants, dry cleaners, art dealers, and all leisure activities.

4. *Social services*: characterizes the new society; expands the premise of the welfare state without direct support from local governments.

In the US, semi-skilled service workers have increased their share of the occupational structure at a lower rate than the managerial/professional labor force. Semi-skilled labor represents 13.7 percent of the labor force (in 1997), with managers and white-collar labor representing 12.8 percent.[58] In summation, the trends show that the Network Economy will hold these business and employment characteristics:[59]

- Agriculture employment is gradually being phased out;
- The steady decline of traditional manufacturing employment, being reduced to a core of the craft and engineering workforce;
- Increasing diversification of service activities as sources of jobs;
- The rise of both producer services and social services, with the emphasis on business services and health services, respectively;
- Retail and service employment will swell the ranks of low-skilled activities;
- The formation of a white-collar working class, made up of clerical and sales workers;
- The relative stability of substantial share of employment in retail trade;
- The simultaneous increase of the upper and lower levels of the occupational structure;
- The relative upgrading of the occupational structure over time;
- The increase in self-employment and rise of flex-time employment.

For the new economy, the source of productivity and growth lies in the generation of knowledge. As many business and economic scholars can attest, the more advanced an economy, the more its employment and production is focused on services. This new economy will increase the importance of occupations with a high information and knowledge content in their activity. As networking and flexibility become characteristic of the new industrial organization, and as new technologies make it possible for small business to find market niches, many rural areas could see a resurgence of self-employment and mixed employment status. The trend began years ago with increased agricultural productivity, when there was a demise of agriculture jobs, just as the ensuing decade showed an irreversible decline of manufacturing jobs. This decline, however, is to the benefit of service jobs, which currently forms the overwhelming portion of employment - closing in on 100 million jobs nationwide.[60]

Planning for workforce development needs to follow the pattern of development that will become the foundation for the coming decades. The service industry, fitting categorically within the four groups above, will require and accommodate much of the employment, however, manufacturing and construction – physical production – will demand high value as information processing is handled within society through the network.

CHAPTER 3

ENTERTAINMENT, TECHNOLOGY, AND SOCIETY

3.1. Changing Cultures

The previous chapter looked at technological innovation and its diffusion into the factors of production. Because of the various ways technology has influenced business, industry, and employment, its rapid diffusion into society is imminent. Chapter Three will examine the leisure and community impacts of technological impacts. Building on the premise that technology is changing the societies we live in, adaptation to technology could change the way humans interact with each other as such technologies become transparent to those people using technology on a daily basis.

This chapter will examine the driving forces for change in several aspects of American society and human life. This chapter will present current trends in computer networking and will discuss the affects such growing interactive information networks will have on currently existing entertainment channels, the human interface with technology, pervasive advertising, and finally, some examples of societal change focusing on the youth of today. Important drivers of change presented through several sections will provide an overview of the future of entertainment, adaptations of technology, and trends of community interaction.

3.2. Entertainment

Certain media outlets, such as the movie industry and television networks, have helped shaped international opinion of popular culture for over eighty years. The entertainment industry and the media have essentially presented to the world American images of democracy and its inherent absolute freedoms. As no coincidence, the world's populations have overwhelmed America since World War II. If one were to travel America, as my wife and I have been fortunate enough to do during my two years of graduate school, and take mental notes of the towns and the people, one might be surprised. The people passed on the streets and in the restaurants of the rural towns along each of America's borders and within twenty miles of large international cities are no longer characterized by descendants of "White Europeans" that pioneered and settled such an expanse of land just over five hundred years ago. America is the most openly expressive and accessible nation in the world, and because of it, old Europeans and European ways are quickly becoming the minority in America as other nations of the world flee to the land of Hollywood. Because of the reach the media and entertainment industries have into our culture, there is no reason why those industries will not continue to play an increasing role in shaping society in the future.

3.2.1. The Rise of Television

The Baby Boomers[a] became the television generation and it was the rise of the communications revolution – the rise of television – that shaped this generation and the world around them more than anything else did. The television changed the face of society in more ways than just simply adding a double chin to the new "coach potatoes." Television was a huge culturally unifying force, something that people used to gain identity and knowledge of the world and their environment. With the mass scale of the one-to-many broadcast, each viewer was able to visually walk on the moon, solemnly watch fallen leaders, join politicians as they addressed the nation in time of reconciliation or jubilation, and discover and subsequently rave over pop culture icons, which turned youth itself into an event. Television also began to consume a significant part of the day for many people.

Instead of chatting with a neighbor outside on the porch, or sitting with loved ones in front of the fireplace or around the radio, people became absorbed with the faces on the one-way communication devices that filled a never before noticed void in the living rooms of American households. In fact, as late as the early-1980s, television was described as "a technological miracle, a wonderful new instrument of communication, capable of widening and enlarging mankind's horizons."[61] To put into perspective the social impact of television, the world-renowned anthropologist Margaret Mead once said "Thanks to television, for the first time the young are seeing history made before it is

[a] Anyone born between 1946 and 1964 is considered a baby boomer.

censored by their elders." As late as 1982 it was written, "Television has given each individual a powerful means of increasing his or her awareness of the world and of his or her fellow human beings. It has made entertainment a basic human right, available on tap and on demand, at virtually any hour of the day or night. It has changed the lifestyle and daily habits of all who have received it into their homes."[62]

No sector of American society has had more influence on the decline of civic participation than the electronic media. The effect of electronic entertainment that is privatizing our leisure time might account for perhaps 25 percent of the decline in civic engagement.[63] Because the television now has such a stronghold on the American family, the evolution of the television will serve as an early gauge of the Internet's appeal as an interactive medium that will have a lasting impact on the Network Generation.

Microsoft founder, Bill Gates apparently has an idea too. Microsoft wants an integrated solution for television, and since Office is that solution for the personal computer, Microsoft is now developing the same interactive concepts for television. He recently named the creator of Microsoft Office to preside over Microsoft TV platforms and services, and the company has staked out some territory in the television arena with Ultimate TV, and in the home gaming industry with the X-Box. In the future, interactive television "will be about integrating functions – combining things like storage, control, multiple data streams and program guides to offer the market something it really wants."[64] You can bet that a mouse-like clicking device will replace the television's remote control.

3.2.1.1. Converging Media

Television will soon be socially stratifying, leading to a coexistence of customized mass-media culture and interactive communication networks of self-selected communities as simple as choosing a channel from the remote control. A viewer will be a part of only the interactive programming that interests the individual or group. To perhaps relate in some way the level of importance Americans hold in their televisions, a speech by the Chairman of the Federal Communication Commission (FCC) Chairman on April 3, 2001, told that more Americans have a television set in their homes than indoor plumbing.[65]

Speaking of plumbing, soon television will be broadcast globally over the network on demand, through the same "pipes" that have been delivering content for many years[a] – pipes that have deep penetration in American markets – local terrestrial broadcast, cable, and satellite. The same companies who now feed cable television to approximately 67 million American customers,[66] are now the leading candidates to supply the broadband Internet to usher in this new age of interactivity. With such a broad customer base to grow from, the market is arriving for the cable industry to be a dominant leader in convergent media – the combining of television, telephone, and Internet service. Cable television operators are simply waiting for entertainment industries to encourage new developments that will exploit that interactive reach into the American home using existing pipelines. From a consumer standpoint, cable companies can now provide high-speed Internet access into the suburban and rural home or small business at higher data

[a] Cable television systems began operating in the late 1940s, but it wasn't until the 1970s that rapid expansion began. In 1971, 5.5 million American households subscribed to CATV.

rates than anything currently available – mostly because of a bigger pipe coming into the building.

If one were betting on the early leader in converging media, the cable industry is an interesting industry to consider. In 2001, studies show that many people, if forced to choose, would sooner give up their phone service than their cable service.[67] Incidentally, such an option may not be far in the future as Voice over Internet Protocol (VoIP) is threatening the existence of the traditional telephone service provider. The cable companies are soon going to have a major market share and long-term competitive advantage due to several factors that are occurring. One big reason is that cable operators have so aggressively expanded digital services for interactive television. Of course, for decades, television has been the cable industry's identity and purpose, but the cable industry is going through a transition much the same as other media industries in delivering Internet-based content.

From a pure technological viewpoint, for many years cable television operators have pushed 120 megabits-per-second data stream via frequency-division multiplexing network technology to the dumb terminal[a] known to the consumer as the television. The signal the cable company sends to each television is divided into signals. Each signal is propagated along the cable with its bandwidth centered on a carrier frequency, known as a channel. Each channel on coaxial cable has a bandwidth of six megahertz (MHz). The total bandwidth of coaxial cable is as much as 500 MHz, capable of data rates to 30

[a] In technological terms a dumb terminal is simply a piece of equipment that sets at the edge of the network and merely plays or projects the data stream sent to it.

megabits-per-second, given optimal conditions of weather, interference, and number of televisions sharing the local broadcast.

The Federal Communications Commission (FCC) has long regulated that cable television channels must operate within specific bandwidths. Channel 2 operates within the 54-60 MHz band, channel 3 on the 60-66 MHz, and so on until channel 6 at 82-88 MHz. FM radio broadcasts are allocated to 88-108 MHz. The other cable channels, channels 14-61 operate from 174 MHz to 450 MHz.[68] Now, for little more effort than the reassignment of two 6-Mhz channels (one channel for downloads, one channel for uploads), the networking technology exists so that cable television operators are becoming the main source for household network bandwidth.

For interactive data rate maximization, cable operators can allocate the entire spectrum of the transmission medium to the Internet stream. Thanks to MPEG-2 video compression and a phase shifting technology known as Quadrature Amplitude Modulation, more interactive content and multiple streams of revenue can be fit into that copper "pipe" than ever before. Data rates of 400 kilobits-per-second are needed to play the standard 300 frames-per-second video that television is known for. In ideal conditions, the copper medium is capable of 15,000 kilobits per second, so the cable industry has quite a bit of time to profit from customers before the demand requires more bandwidth from other mediums. In all likelihood, fiber-optic connections will be reaching homes just about the time consumers exhaust the bandwidth potential of coaxial cable. For now, though, cable

is opening up vast new opportunities for entertainment and productivity in the home and office on a reliable infrastructure with reasonable costs and plenty of room for expansion.

Other common transmission medium have their own benefits and are competitive in price, but each have drawbacks that threaten the long-term viability of the technology. The next best transmission medium is Digital Subscriber Line (DSL), but the customer can be no further than four miles from a telephone switching station to receive adequate service, so there are distance limitations with DSL, even as the technology matures. Competition is also growing from the Direct Broadcast Satellite (DBS) industry, which has enjoyed a steady increase in subscribers since 1999 when it was given the right to broadcast local programming. Local programming combined with two-way satellite Internet service has given DBS 13 millions subscribers in 2000.[69] However, latency and transmission delay issues effect the rapid deployment of satellite Internet service. Fixed wireless and mobile wireless are ever-increasing in speed and capacity and could eventually offer faster speeds than any wired medium. However, wireless transmissions have regulatory issues concerning the deployment and use of spectrum as well as security issues. While fixed wireless Internet access is currently offered over the unregulated 2.4GHz range, and soon in the 5.8GHz range, broadcasting still falls within the FCC domain in America. Nevertheless, with time, the industry will overcome technological barriers and the market will demand reduction of regulatory constraint.

In the meantime, competition in the media industry will be tough, but until the likes of AT&T and MCI can deliver television programming into households, the early leader is

cable because cable can offer voice and broadband options now. Because of this, AT&T Broadband and other network access providers are making moves as they buy up smaller cable companies and content providers across the country. The Internet favors an unregulated business environment, so each transmission medium holds a key to its own digital future. The leader that will emerge will be the medium that most appreciates customer value.

3.2.1.2. Diverging Providers

While it seems the Internet could fully converge to be one universal network, the dream of one pipe may be just that – a pipe dream. While early visions of what the Internet could become are very plausible – that the Internet would deliver voice, data, video, and other streams into the home or office through a single cable, the reality is that evolutionary business will dissect the pieces of network to create niche markets for multiple revenue streams in every imaginable sector.

For example, cable technology currently allows the delivery of voice, data, and video into the home through cable television subscriptions. Yet nowhere in American can you find a cable service invoice that charges for only one combined service. Subscribers are charged for television and Internet access separately, currently $40 per month for each service even though there is no extra physical installation necessary for the delivery of the Internet stream, which also carries the voice stream. The same pricing scheme applies to every niche market for data services, wired or wireless. For the foreseeable future, at least

until the market demands otherwise, there will be multiple interpenetrating data and voice networks, but the industry has yet to find out how many monthly services people are willing to subscribe.

Riding on the coat tails of monthly service subscriptions, open access basically takes into consideration the informational pipes that come into homes and businesses across the nation and considers them a public utility. Proponents say that users should not be charged a fee for the right to use those pipes, which would allow free public use to exist, but if the users needs particular content, such as a search engine or a certain content provider, charge for those premium services. Think of the public utilities system, consumers are not directly charged for the pipes in front of their house. The are charged for the water, electricity, or sewer – the content, if you will – that flows through those pipes. However, clouding the open access debate are vertical integration issues such as those brought to light in the America Online (AOL) and Time Warner merger. The question of vertical integration was raised because a content provider (Time Warner) was merging with a content distributor (AOL).

Ever how the business futures play out, in the long term, a cable television provider will be a telephone service provider will be the Internet service Provider. Make no mistake about it; international carriers powered by Global Crossing and the likes of AT&T and Sprint will eventually have fiber service to the doorstep as the cable industry tries to keep up. Converging media will arrive and consumers will get their interactive media from the same type of company. However, in the coming age of network service providers, the

company that owns the distribution pipe may not be the same company who provides the content.

3.2.2. Evolution of Traditional Entertainment

To think back at how amazing the one-way communication channel of television influenced families, neighborhoods, and communities as it has ascended to perhaps commodity status, one can only imagine the potential for two-way, interactive television. While the appeal of entertainment and news coverage will continue to be strong, the merging of television with the interactivity of the Internet will usher in an era of total connectivity within the household, perhaps bridging any remnants of a digital divide.

Traditional television networks are concerned about the broadband Internet expansion into homes across America. Cable television and the relatively free network television entertainment medium has the largest to lose if during prime time television, which has traditionally been 8:00pm to 11:00pm. If the prime time audience decides to spend that time on the computer or other network activity, the industry will evolve to broadband to attempt to recapture the market. Situation comedies and hour-long dramas that have characterized prime time television for the better part of fifty years, through the 1990s saw the transformation into news magazines like "Dateline," and reality-based programs such as "Who Wants To Be A Millionaire" and "Survivor."

During television's evolution, the medium has moved from one-to-many, then to cable with one-to-some, now to the Internet with one-to-one and back again. To that end, there have been early attempts at interactivity, as the television network NBC has been a leader in trying to crossover television audiences to more interactive roles in their television broadcasts. Several Dateline episodes in recent months have tried to involve the television audience with feedback programming based on computer-submitted responses to broadcast questions.

The network has also attempted to launch a television-based Internet portal by the name of NBCi.com. Such a venture into untried territory proved difficult for the network to finance, and in fact, proved to be a double-edged sword. Amid a well-marketed advertising campaign for the NBCi.com service, the market has proven that broadband Internet access has not reached a critical mass to exploit many of the interactive multimedia features the portal offered. Business models that have worked for years on television networks are not yet easily reproducible in the online world. Banner advertising and other attempts at product placement have not met the same success as time-tested paid broadcast advertisements. To that end, advertising revenue has not generated enough support to sustain the television network's expansion into the interactive information network. Be assured though, as soon as a model for profitability is developed for interactive broadcasts, some reincarnation of NBCi.com will be back.

3.2.3. Music Industry's Aging Business Models

Due to technological change in society, business models that built the foundations of entire entertainment industries of previous eras are crumbling in the information age. Take the recording industry for instance. For the better part of the 1900s, major recording labels created a vertical industry where the same companies that signed the musicians also distributed the music, promoted the musicians and live performances, regulated consumer prices, and performed other profitable services.

In the music industry, a four-person band or a single act could never have the means to successfully promote itself outside of its local area. The band could never distribute their music without producing expensive cassette tapes or compact discs. The self-financed act could never fill auditoriums without the promotion that precedes any show. Musicians were virtually locked-in with the record companies. Music promotion and distribution can now happen between users via the network, with the proceeds of the sale of music going directly, or perhaps with a greater return, to the creators of the music.

This is obviously making the entrenched recording companies very concerned about new digital distribution technologies. To the recording industry's dismay, their industry will never be able to halt the progression of technology. Therefore, the Federal government is scrambling to form new policy to support an aging industry in a different age. In the interim, industry players have time to formulate new business models and revenue structures while the industry reinvents itself with new channels of operation, distribution,

and revenue. The network is here to stay, so the recording industry must deal with the change, after all, what more perfect distribution medium for a digital product than a digital highway.

Studio heads already see what unauthorized file swapping has done to cash flow at music companies. The numbers are staggering. In 2000, the Recording Industry Association of America reported that shipments of CD singles fell by nearly 40 percent. A recording industry spokesperson said the drop in singles sales "were principally brought on by new options provided by the Internet."[70] Surveys by the Pew Internet and American Life Project show the number of American adults downloading music over the Internet in all age brackets grew to six million people per day.[71] However, the musicians are the group most likely to benefit in the long term as "Americans spend more money each year on live music than on recorded music."[72]

The share of digital information, however, is not new to the Information Age. The share of digital information first appeared in the computer software industry. If someone wanted a piece of software, the user could simply transfer information from a remote computer to install on his or her personal machine. Some companies, like Corel, and later, America Online, actually gave away their software for free, although each with different motives; Corel was reaching for brand building in the early stages of the word processing market and America Online was developing a subscriber base in the early stages of network communications. Regardless of the motive, these new business models gave way to shareware where software companies would give away their software in

hopes the user would enjoy the software enough to either purchase an upgrade or purchase an extension for the shareware after the free use period expired.

Content distribution is now entering the era of infinite bandwidth. People can download megabyte files in seconds and participate in streaming interactive multimedia. The creators of the content need compensated in a fair manner, but how much people are willing to pay for content services remains to be seen. Says Harvard Economist William Fisher, "You can't charge very much if your customers can always peel off and get basically the same thing without paying."[73]

3.2.4. Code Switching and the Interactive Blur

When interactive television moves into the later stages of market penetration, we can grow from several social patterns that have emerged from the early stages of interactive multimedia immersion. Thus far, multimedia appears to be supporting a social and cultural pattern characterized by many features. First, widespread social and cultural differentiation is leading to the segmentation of the users.[74] Election coverage and sports broadcasts will be the only live broadcasts; the other activities will be live and interactive with other people. As for users of the media, they will increasingly diversify according to their interest, when they want access to the media.

To paraphrase Nicholas Negroponte, the founding director of MIT's Media Labs, "video on demand makes prime time, my time."[75] Television and home entertainment is

changing from a push system to an interactive pull system where network users reach into the network and find what they want to interact with or watch. Soon, users will be able to learn how to make jambalaya from popular chefs like Emeril Lagasse or from a southern Louisiana Cajun housewife instead of being required to sit in front of the television and wait for a particular program to be broadcast.

In his recent book, Stephen Doheny-Farina argues that the Internet is simply "today's next big something" that will not live up to over-hyped expectations. He says "people were saying the same thing in 1971 about public access television that they are saying now about the net."[76] In his book, *The Wired Neighborhood*, he makes issue that the Center for Policy Research received a grant from the National Science Foundation in 1971 to study the roles that cable television could play in communication and decision-making at the community level. The director of the program is quoted as saying cable television could be the way to "provide neighborhoods with their own TV networks which could be used for community dialogues with elected officials, for community-wide citizen polling, and for communication among members within a community."[77] The point of the entire chapter was that since cable did not meet the expectations back then, people are simply getting worked up over the Internet for no reason. Doheny-Farina says the Internet will never allow for such community interaction, yet nowhere in his argument did he mention the crucial element of community interaction: human interactivity. Obviously, community is not going to be affected if the participants are only watching local events and local politicians and not interacting with them. Certainly, there is not much process to a one-way communication stream.

So when it comes to building community, will the Internet behave more like a Boy Scout troop or a television set? In the second half of the 20th Century, Americans' social connectedness plummeted. As we will see in later sections, observers place much of the blame for this decline of community on the growth of television watching – instead of attending social or civic events – as a central leisure activity. As children spend increasing amounts of time on the Internet, will these new habits contribute to or detract from our current and future social capital? Can the promise of the Internet be harnessed to promote interactive community participation among future generations, or will on-line living contribute to the decline of off-line connection? Imagine what would happen if the Knoxville City Council used online polling representing citizens of the city's districts instead of having elected City Council members do the voting for them. For a recent issue, such as deciding the fate of a proposed planetarium, would bringing the citizens online to discuss the issues have made for different decision outcomes?

Such interactivity will lead to an increasing social stratification among the users. Not only will choice of multimedia be restricted to those with time and money to access, and to regions with enough market potential, but also cultural and educational differences will be decisive in using interaction to the advantage of each user. The information about what to look for and the knowledge about how to use the messages will be essential to truly experience a system different from standard broadcast mass media. Thus, "the multimedia world will be populated by two essentially distinct populations: the interacting and the interacted, meaning those who are able to select their multidirectional

circuits of communication, and those who are provided with a restricted number of choices."[78] Class, race, gender, and country will largely determine those who fit into what category.

Communicative messages in the same system, especially if the system is interactive and selective, induce an integration of all messages in a common cognitive pattern. Today, mass television seems to blur the contents of the programming in borrowing codes from each other. For instance, newscasts appear as audiovisual presentations snipped to six-second images; pop music is made for MTV and other video music channels; trial cases are broadcast as soap operas, as so on. "From the perspective of the user, the choice of various messages within the same communication mode reduces the mental distance between various sources of cognitive and sensorial involvement."[79] This ends up blurring codes, creating a random mixture of various meanings. Moreover, the blurring does not stop with the entertainment industry, which further extends the blurring and code switching. "Products and services are merging. Buyers sell and sellers buy. Neat value chains are intricate economic webs. Homes are offices. No longer is there clear line between structure and process, owning and using, knowing and learning, real and virtual. Less and less separates employee and employer."[80]

Perhaps the most important feature of interactive multimedia is that it captures cultural expression in all their diversity, from the most elitist to the most popular, from the worst to the best, from the well intended to the mean spirited. Trying to decipher what is news and what is comedy, what is popular culture and learned culture, and what is education

and persuasion is going to be one of the most prodigious challenges of all for a generation growing up when they really don't know the truths that other members of society know as truths. Making the connection between viewing violence and acting violently affects culture and expectations of our society and of our self. Combining all these uncertainties for the interactive mind, the uncertainties construct a new environment, and together, they make virtuality a reality.

3.3. Technology in Society

As the personal computer has metamorphosed from a word and number tool to an interactive communications device, its once natural, built-in obsolescence – the need for an ever-faster processor – has faded away to near irrelevance. Gone are the days of yearning to have a faster processor to play the latest games or operate the most useful applications. Most all computers today have adequate processing power to handle the latest software. Even extreme gamers and graphics professionals now focus their needs on high performance sound and video hardware, but nothing additional is needed for the computer's processing power.

Today the need is for speed of connectivity. All the talk around the water cooler in the office is how fast their modem can connect to the network. Human nature is to want the stuff that we cannot necessarily have, and to know that all that dazzling content is somewhere out in cyberspace, the faster we can get that content from out there to inside our personal computer the more satisfied we are.

Even if global Internet traffic proves to be growing at less than the million fold every ten years as expected, the expansion will still be huge. While current growth to the network comes mainly through the spread of 56 kilobits-per-second dial-up modems, the next wave will feed on cable links, most of them always on, running between five hundred and a thousand times faster than dial-up modems. Not only will this technology increase the flow of bits, it will also sharply reduce the hassles and frustrations of the World Wide Wait, thus greatly spurring further demand in applications and market penetration.

As George Gilder writes in *Telecosm*,[a] soon processing power and bandwidth will be abundant; however, in December 2000, only six percent of homes in America had broadband[b] Internet access.[81] Nevertheless, the current worldwide fiber-optic ring, known as the Global Crossing,[c] consists of many "crossings" often buried undersea or underground to build "the world's most extensive global fiber-optic network to provide global managed network services from city to city, building to building, and desktop to desktop."[82] Overall, the company plans an integrated global network of some fifty-five thousand miles linked to state-of-the-art undersea technology. This fiber will be the backbone of the global Internet, and this bundle of fiber will trickle through the network separating itself through various service providers, into the building ideally as one cable.

[a] Telecosm is considered an umbrella term for fiber optics, wireless telephony, and infinite bandwidth.
[b] Broadband is a term given to the data throughput of at least 1.544 megabits-per-second.
[c] In 2001, the fastest transmission medium available is OC-192 fiber, which allows ten gigabits-per-second.

As for technological innovation, processing power has been overcome, soon bandwidth will be made available for the taking, and data storage issues will dissolve away as applications will be instantly available from remote storage. As noted throughout George Gilder's *Telecosm*, all the resources that are seemingly scarce today will be in abundance tomorrow. Computing is becoming so ubiquitous that the computer itself is receding into the background.[83]

3.3.1. Profiting From Technology

High-speed interactive network connections will eventually make their way to every home in America. Fiber optics will light a path to the door of most every urban and suburban home, and filling in the gaps will be fixed wireless in the rural areas and areas where wired connections may not be physically possible or economically feasible. However, for the short term, business and government policy will dictate the saturation of such technologies into the hands of the consumer.[84] Because the network is having such an impact on the lives of every in the world, every regulating agency and CEO is trying to get their piece of the pie.

As with any technology, be it the spread of the popularity of the automobile, the television, the microwave oven, or the personal computer, early adopters will be the first to sustain the high cost and technical glitches that early products intrinsically bear. These people are often known as the early adopters, or the "haves," in society. And while the "haves" are often are the people who own luxury items such as high-definition

televisions, luxury automobiles, and broadband computer access, the market will offer comparable products at reasonable prices for the laggards, or the "have-nots," in society. These people do not require the most luxurious car, often settling for the essentials of a Ford Escort over the Mercedes-Benz. They own a television, but not high definition with all the added features. They tend to value function over form, and straight operability over added pizzazz.

A divide exists with the growth of any product or technology. There was a television gap for almost 20 years. People still rode horseback years after the first cars rolled off Henry Ford's assembly lines. However, in May of 2001, America is only five years into the commercialization of the Internet and already 80 percent of homes have dial-up Internet access. [85] If government policy forces the spread of broadband deployment, the effects will be the stifling of innovations before they come to market. An incentive must be present to encourage development in areas of emerging technologies. Allow broadband profit-taking against those subscribers who want to pay for such premium service at the start. In the meantime, those early adopters will fund the build out of the broadband infrastructure, while functional users continue to use dial-up network access and perhaps cheaper broadband access in the future.

As with other early technologies, broadband deployment will come to those who wish to pay the premium, but the basic core of functionality will be afforded to those who want it. Policy makers dealing with the Digital Divide need to be careful to not overreact where there is not a real problem, but only a naturally occurring gap. In time, the market will

find these people and offer products to satisfy them. Short-term greed invariably trumps a credible long-term investment strategy, but in the end, the Digital Divide will be closed not by means of generating revenue on the installation of the pipe, but rather on the digital oil that pumps through in the form of content – commerce, services, and means of production. Revenue is not made simply on the installation, but rather on the extended payback period.

3.3.2. Pervasive Advertising

In the mid-1900s, free Internet Service Providers (ISP) existed in the hopes that advertisers would subsidize the bill for dial-up customers. The business model was that an ISP would become, in essence, an advertising agency for online advertisers. The advertisers would become the revenue stream for the ISP in the hopes that the online user would gain a sense of brand identity for the advertised products, or even better, click through banner ads to purchase goods from the advertising business. The customer received free Internet access, but had to deal with watching advertising on their computer screen anytime they were online. This was a good transitioning business model, and a model that worked quite well for some ISPs, but in the end proved only that online users quickly learned to ignore banner ads because the ads were in the same place all the time.

Banner ads are a passing phase. So are television commercials in the digital age. Currently when local cable operators distribute both digital and analog content to their subscribers, local ads are missing since digital feeds from national programmers such as

ESPN do not provide local advertisements. Advertising in the Network Age will be more subtle than banner ads across the top of the screen or commercial breaks in the broadcast.

One early business model that could work would be with Video On Demand (VOD) or pay-per-view television. The digital subscriber could have the option of viewing a movie either without advertising for a $4 charge, or a $2 charge to watch a movie with ads and trailers.[86] Of course, that is a short-term idea because as people are able record to their hard drives as easily as they can record to a VCR, any sustained revenue from a VOD service could be short lived. Broadband Internet will allow users to download a two-hour movie from the Internet while the popcorn pops in the microwave.

For Interactive television in a world of unlimited bandwidth, television commercials will be just that – interactive. Today, when most people think of interactive advertising, they think of something that simply links out to the Internet. However, with unlimited bandwidth, the discussed advances in the information-gathering capabilities of firms, interactive television and interest-driven advertising will make interactive advertising as fun as interactive content. Imagine an ad for a luxury sports car company. When you interact with the ad, the first thing that happens is the display quickly fades up to video of that car racing across the screen, crystal clear video with surround sound audio in every direction. The menu cascades down over the video at as the dust settles. In the background, while the navigation menu is on the screen, the car is racing off into the distance from a first-person perspective and the feeling will be visceral and exciting. When you interact with different sections of ads, they will still be video based, tailored to

your stored general preferences that will make you want to rush out and buy that car. In the thirty seconds of the past, advertisers created a brand impression. With tomorrow's advertising, the pervasiveness of the ad and the time spent interacting will create a brand experience.

Ads will be more than one-to-many advertising of today, which are basically only static pictures of products and sound effects from the Internet. Product branding and making products appeal to individual users will escalate advertising to unseen levels of persuasion with heightened levels of emotion and humor. Advertising will change profoundly over the next couple of decades, although there is a good chance that nobody will notice because most meaningful changes will not be visible – unless you are watching your neighbor's network device at the same time, which will be entirely different from the programming sent to your devices. Your vegetarian neighbors just gave birth to a baby boy, so they never see advertising for sports cars, beer, or hot dogs. You, being single, never see advertising for mini-vans, diapers, or tofu.

The pervasiveness of advertising will be focused on the preferences that will be gathered by user-tracking software that records your TV- and Internet-viewing habits in detail. The changes behind the scenes are the changes we should be aware of most, yet advertising will become surgical, stealthy, eerily targeted, and disturbingly omnipresent. Various data applications can cross reference your preferences with your purchasing history – to allow advertisers to know that you are married, that you have three young children, that you eat meat, and that your refrigerator is fifteen years old. That way you will be shown

commercials for minivans, cheeseburgers, and replacement refrigerators. From a paranoia standpoint, the information gathering we don't know about is the unwelcome side effect.

However, the market-segmentation advertising model is not exactly new. MTV is not a music video station; it is a product-selling medium, which performs product placement in front of a highly targeted audience. That product placement may the shoes the movie star is wearing or a mention of a product in a song. Imagine you like the trendy shirt that your favorite television actor is wearing on the program you watch every week. Click on the shirt, buy a shirt just like it from a network vendor, and have it delivered to your home before you go to work the next day. Imagine a cosmetic company being able to focus advertising to a target audience of girls, ages 17 and 18, perhaps only high school seniors, and only those going to the prom next month, but out of those, only the teens with blond hair and blue eyes whose household has purchased red lipstick in the last three months.

Image the value generated for the content provider by such market segmentation. What would such advertising be worth to the content provider or the advertiser to know they have placed their advertisement in the face of their precise market? Imagine the value created for the content provider or distributor to have such precision in direct advertising to each of their individual customers. That is not just entertainment with advertising, that is entertainment as advertising; and that is code switching as mentioned earlier.

Technological diffusion and adoption rates will be blindingly fast because of the pervasiveness and persuasiveness of advertising. Happy consumers will also use the

network to inform friends and family around the world about the great new product or service they have discovered. No industry will be left untouched as we are entering a world where getting customer attention will become even more difficult because every other competing advertiser is vying for that same niche attention.

3.3.3. Peer-To-Peer Technology

At the end of 2000, the world's Internet-connected personal computers hosted an aggregate 10 billion MHz of processing power and 10,000 terabytes of storage.[87] This is the fuel powering the current peer-to-peer (P2P) revolution, as the hidden capabilities of individual personal computer hardware represent a huge, virtually untapped resource. Peer-to-peer has the ability to harness this otherwise underused hardware that sets at the edges of the network. For example, all those computer mentioned above are idle for hours each business day, so there are trillions of computer cycles that could be harvested for P2P computing. From a networking perspective, the idea behind P2P networks are simple. Rather than place huge files of digitized entertainment on a massive server for every person to download, the files are stored on the individual hard drives of thousands of PCs. P2P applications simply act as the traffic cop between the file seeker and the file server. Everyone shares bandwidth to make up for the lack of a central storage location.

In a proven use of P2P, the software allows for every idle networked computer act as a source of computing power. This P2P application is known as distributed computing, as SETI@home has been successful in harnessing unused computing cycles in the network

for chugging through terabytes of backlogged information gather from satellite listening into outer space. In a computer's downtime, the P2P application downloads a block of information, then processes the information, and sends the processed information back to the host computer. With millions of inactive home and office computers processing data for SETI each day, the organization has processed more information than would ever have been able to do by itself. A similar application is underway at Oxford University in London. Called "distributed computational chemistry," anyone with access to a personal computer can help find a cure for cancer by giving processing cycles from their computers to the world's largest ever computational project, which will screen 250 million molecules for cancer-fighting potential with the power of P2P networked computers around the world.

One of the greatest technical problems lies in the hands of Internet Service Providers (ISPs) because P2P shifts much of the burden for computing out to the Internet and away from the peering computer and the P2P service provider. For example, Napster[a] can provide access to untold terabytes of music without having to pay for centralized data storage of that size. Such P2P applications can enable the transmission of millions of multi-megabyte files around the Internet, which burdens the ISPs that send data into the homes of the millions of digital music uploaders and downloaders.

Many people in the film business believe P2P technology is little more than a license to steal. P2P companies say that users break the law, arrest the user and not the company. In

[a] Napster was the first widely popular file-sharing program to be contested in a court of law by the recording industry.

other words, arrest the burglar, not the company that made the burglar's tools. Thanks to a few upstart file-exchange companies, industry watchers say that 400,000 movies are swapped on the Internet every day.[88] Stopping one company, such as Napster, does not stop file sharing. The industry does send a message, and other P2P companies are waiting in the wings for non-litigious relationships with the industry for the long run.

P2P networks may have a future with content distribution as P2P companies simply acting as intermediaries to collect royalties/transmission fees before downloading the content. Perhaps they see the profit margin for the predominant company that distributes entertainment industry content. Today, "Blockbuster takes a 50 percent revenue for distributing videos and DVDs for the studios."[89] The motion picture industry would obviously want to keep more of the movie, just as would hundreds of P2P start-ups.

3.3.4. Wireless Communication

Wireless communication is growing in terms of geographical coverage and the speed that data rates travel through the air from transmitter to receiver. Wireless communication will have a huge impact on the diffusion of the Internet into our everyday lives. In fact, the concept of the Internet being wireless opens up entire new possibilities for industries to change our lives. Pervasive computing and location-based services are two developments that will shape the next phase of Internet development. In fact, the changes are going to be so extreme that the term for this next phase of Internet development is the evolution of the "Hypernet."

In the future, high-speed multimedia connections will be possible from every network connection, be it for traditional desktop computers or handheld network devices. Handheld devices in the future will take the form of either voice-enabled laptop or handheld computing devices, which will grow wireless local area network (LAN) environments, or cellular telephones will continue in growth and processing power to take on characteristics of handheld computers. Whatever the case, handheld network devices as powerful as early-2000s desktop computers will be available with advanced user interfacing capabilities within several years to remove people from the constraints and limitations of the desktop.

Mobile computing devices, broadband access, wireless networks, and computing power will be embedded in everything from bicycles to factory tools. All of these network devices are converging into a vast global network – a Hypernet – that will fuel exponential change in business model innovation. "The Hypernet is to the Internet what the Internet was to early proprietary computer networks."[90] It will further expand the boundaries of firms, alter corporate and customer behavior in unforeseen ways, and put at risk traditional profit and revenue models.

As mentioned throughout this thesis, devices will continue to shrink, processor power will continue to double and redouble, chips will be embedded into every object, bandwidths will continue to expand, and humans will create more and more network-based solutions to everyday problems. This is all going to occur quickly. More than 400

million people worldwide already use wireless phones. By 2005, global companies will generate up to 20 percent of their business through mobile devices.[91] For example, in Finland, with third generation (3G) telephones, people can stand in front a soft drink vending machine, punch in a few numbers on their keypad, and out pops a soft drink.

Think of all the ideas that fueled the dot-com rage of 1998-2000. All those people who were able to write a few pages of computer code to instantly make a former cumbersome task easier and more profitable were instantly on their way to Wall Street with their Initial Public Offering. Keep in mind, most all of those ideas were for processes that centered on services to a fixed location. With millions of people carrying around wireless network devices as they move from place to place, the potential idea pool for the second wave of Internet ideas is infinitesimal.

3.3.5. Location-based services

Location-based services are something that wireless devices and wireless application providers are coming to age with. Unlike the desktop Internet environment, where location is not much of an issue, wireless users and the wireless service providers can derive value from information about their immediate surroundings.

Today, wireless carriers have a general idea of where their customers are by using cell information and sectors within those cells. After all, the network has to know where the subscriber is physically located to deliver inbound calls to an individual wandering about

inside the individual wireless Local Area Network (LAN). However, recent legislation is giving a tighter focus to wireless carriers that will afford location-based services a higher degree of precision. The Federal Communications Commission (FCC) mandated that wireless communications carriers be able to pinpoint the location of emergency 911 calls in their own network to within 100 feet by October 2001.[92]

While this is ideal for Emergency-911 situations, in that a wireless operator can pinpoint the geographic location of their customers in time of need, the technology opens a Pandora's box of opportunity for mobile business applications for pervasive advertising and location-based services. All wireless industry players obviously see the public benefit of being able to pinpoint wireless emergency calls, but they are also enticed by the prospects of piggybacking commercial applications on the location technology to generate a new revenue source.

Applications include being able to keep track of traveling companions in crowds, or not worrying about teenage children in the mall or at theme parks. One company, known as Digital Angel, markets a location-based product that takes the form of a wristwatch. With their service, loved ones or health care providers can monitor the user's vital signs, and can send all that over wireless networks to other parties or remote computers. This could be helpful for family in monitoring highly-mobile elderly family members, or Alzheimer's patients, people on probation, and possibly keep an invisible leash on pets. People currently allow wearable products such as jewelry and watches, so the thought of an all-in-one communication device is not that much of a stretch.

Merchants will be able to sell products and services based entirely on where the potential customer is physically located at any given moment. For example, your mobile device may ring whenever you get within a couple hundred feet of a sandwich shop that invites you to come in for a dollar off the purchase a sub. On the other hand, a shopper near a department store could be alerted of an ongoing sale by receiving an electronic discount coupon to entice her into the store.

Business travelers are considered more likely to pay for on-demand services such as finding nearby hotels with vacancies. These wireless users are from the corporate environment, where typical diffusion of technology first occurs, as they are more likely to pay higher monthly bills. Vendors of location-based software are just beginning to gain traction, foreshadowing a time when faster network speeds and new devices will cast location-based services in a new light.

Of course, this constant bombardment from advertisers could annoy us to death. In time, services will emerge in the market that will assist users in controlling, perhaps even allowing, the user to select the advertising they receive. Privacy issues will surely flourish, as consumers have no problems with the concept of being found instantly during an emergency, but the idea of tracking someone's movements is quite disconcerting.

Other negatives of such services are users being spammed[a] or having their information sold to third parties.

However, policy will eventually need to be implemented outlining the allowable tracking of movement. Through stored information, location-based service providers could establish a pattern of daily movements and could forecast where a user could potentially be at a certain time of day based on data showing where the user normally travels. Such invasiveness could restrict people from going to a political rally or participating in other public events. Wireless technology may is seen by many as liberating, revolutionary, or necessary. However, those who know better might complain that being perpetually reachable is becoming more a hindrance.

Unsolicited commercial email is ready to blast onto the cell phone scene as millions of mobile phones have spam-ability. New Jersey Congressman Rush Holt is looking to ban spam on wireless network devices. If Congress passes legislation that will ban commercial email over cellular networks, the cell phone companies will not be able to permeate the personal appeal that exists with personal computers. With the coming to market of third generation (3G) wireless telephones, wireless telephone carriers may soon need to reinvent themselves into a data communications company than traditional wireless voice company to capitalize on the trends in mobile data communications.

[a] Receiving copies of the same message that was sent to large numbers of users on the Internet. People "spam" the Internet to advertise products as well as to broadcast political or social commentary.

The sheer momentum of the wireless industry's growth has stoked projections of rising revenues from mobile commerce and related location-based services. The Strategis Group projects annual revenue of about $4 billion from location-based services by 2004, when subscribership could approach 23.4 million people.[93] The growth rates of mobile phones versus personal computers are often cited as a harbinger of mobile data's increasing importance and future dominance in accessing the Internet.

3.4. Growing With Technological Change

Before I present the section on the "Baby Boom Echo" generation[a], or what is being appropriately dubbed the "Net Generation," I wanted to begin with personal observations on how far technology has come in just my lifetime. Having been born in the exact middle of what is known as the "Baby Bust" generation[b] or the period referred to as "Generation X" in the popular press. I feel a sense of companionship with the Net Generation in that I have grown to accept technological change and incorporate as much as feasible and practical into my life as many N-Geners were born into. I feel challenged to talk about the Net Generation because, as Don Tapscott, author of *Growing Up Digital* puts it, Generation X "is the oldest segment of the population whose computer and Internet habits resemble those of N-Geners and provide the closest adult experience from which we can begin to predict how N-Geners will master the digital universe."[94]

[a] The Baby Boom Echo generation includes people born from the years 1977 to 1997.
[b] The Baby Bust generation includes people born from the years 1965 to 1977.

I find interesting how many things Americans now consider necessities were viewed as frivolous contrivances only a few years ago. I remember some of my first experiences with the first personal computers. Radio Shack sold the TRS-80 to anyone who would venture the courage to learn the BASIC programming language to get the computer to perform even the most simplest input calculations. The device had no storable memory; so, once the machine was turned off, the user needed to start from scratch the next session. The computer was a complete waste of time, except to play text-based games and simple spreadsheet functions. Soon afterward though, data could be recorded onto audio cassette tapes and the user could reload any program into the limited memory. Other than gaining familiarity with a keyboard and programming lines and lines of BASIC programming code, the TRS-80 was useless except as a novelty, although there are legions of TRS-80 fans on the Internet who would dispute that assertion.

Then came the Commodore line of computers. True to Bill Gates' infamous prediction that no person should ever need more than 128 kilobytes of memory, the Commodore 64 offered everything that a consumer device required. All the games were sized under 64 kilobytes and offered endless hours of play through the mid-1980s. The graphics were decent and provided an advanced version of most Atari games. The Commodore had a disk drive that could save and load information to the onboard memory. To imagine that network computing could have been born with the Commodore had they only provided modems. The first time I heard of what became modems were from people who would pull Commodore software from Ham radio frequencies and save them to 5-1/4" floppy disks. The first software pirates I knew were people who would tune into certain

broadcast frequencies after midnight and record the radio waves onto floppies to awaken the next morning with a disk full of data. Each morning was like Christmas for some people who would awaken to list the contents on the floppy disk.

The next step of consumer personal computers was the 80086 line of processors by IBM. Of course, IBM took personal computing to the next level. Memory levels of 512 kilobytes alarmed most people into believing it would be the last computer they would ever need. Of course that way of thinking soon subsided as personal computing began the rapid ascent into everyday life. Soon computer processors were growing in speed and performance with the 80286, then perhaps the mainstream with the 80386 and 25-megahertz processors. Hard disk storage began to grow, and by 1990, hard drives broke the megabyte barrier. Then math coprocessors were integrated into the processor with the 80486 and applications development began rapid growth on the IBM OS/2 platform.

Computer users were putting more stuff on their hard drives. Soon, accessing the programs and files were becoming a time-consuming process. The Macintosh had a couple of innovations that today are so commonplace we hardly even think about them. Macintosh was the first computer to use a Graphical User Interface (GUI) as icons on a desktop environment that were used to access programs, disk drives, and perform other one-click functions from the mouse, which was also Macintosh's 1983 innovation. In 1990, Microsoft ended its OS/2 development partnership with IBM and went its own way with Windows 3.0. The Windows operating system and GUI was soon popularized that enabled point and click simplicity to replace tedious and complicated IBM/MS DOS

commands. Efficiencies in computing were beginning to take shape. Companies were discovering the functions that could be moved to the computer to save time and resources. Both Windows and Intel popularized the personal computer for both industry and consumers by making computer-interfacing intuitive, user-friendly, and appealing.

Since numbers could not be trademarked, Intel created a brand name for the 80586 processor, and soon the Pentium-class processor was soon popularized and ingrained into the minds of the growing legions of computer-minded consumers. With Windows 3.11 for workgroups, and the networking capabilities inherent to the operating system, computing power and versatility was changed forever. Before the release of Windows 3.11, if you asked people what the Internet was, they would look you with a blank stare.

In early 1991, I participated in my first chat session on a Sun System, which was considered the Internet from a college student's perspective. Typing real-time with students in far-off places was an exciting event. Using the tedious commands of Gopher and ERIC to research on the Internet was changed in 1991 when Tim Berners-Lee developed the World Wide Web. In 1992, I remember connecting directly with friends in my hometown by dialing their phone number directly from my computer. The ability to call another telephone from my computer would allow my computer to connect with other people and their computers that were connected to the same network. It was neat to exchange small sound files and programs with distant people and databases known as bulletin board services (BBS). However, what seemed like just overnight, the BBS stage was transformed into online services, and I was hooked on America Online before there

were a half million subscribers. Within two years, the World Wide Web was fully popularized and computers and networking have never since been the same.

With the arrival of network computing, the power of multiple computer and multiple users grew exponentially. In fact, Metcalfe's Law states that "the value of a network grows by the square of the processing power of all the terminals attached to it."[95] Processing power is still developing at the rate of Moore's Law[a] but has leveled off in its rate of usefulness. A majority of current computer applications need no more than a 350 megahertz processor to operate effectively, but what is amazing is the rate that transmission speeds between computers increase. Gilders Law states "bandwidth grows at least three times faster than computer power. While processing power double every eighteen months, communications power doubles every eighteen months."[96] In fact, more information was sent over a single cable in a second in 2000 that was sent over the entire Internet in 1997 in a month.

Now the network is becoming the computer. The computer is simply the interface between the human and the network. In time, the computer as we know it will become more of an intuitive network interface device. Throughout my adolescent years into my late twenties, I watched the personal computer transform from nothing more than a glorified calculator, into an overpriced arcade game, to a homework aid, to a great communicator, and now into a machine that is useless unless it is connected to other computers through the Internet. The trend will continue to make the computer more of an

[a] Moore's Law states that computer processing power will double every eighteen months.

information translator and repeater while becoming more network-based and less pervasive all the time, a trend the Net Generation will enjoy, which will be covered in the next section.

3.4.1. Net Generation

Taking into consideration the changes of the twenty years, growing with changing technologies as most of us have is going to be much different from being born into developed technologies. The children of today will have a different paradigm of technology and technology's usefulness in everyday life. Don Tapscott, says "we should pay more attention [to today's youth] because the culture which flows from their experiences in cyberspace foreshadows the culture they will create as the leaders of tomorrow in the workplace and society."[97] Tapscott says the Net Generation – the children of the baby boomers, or the baby boom echo generation – is "exceptionally curious, self-reliant, assertive, contrary, smart, focused, able to adopt, high in self-esteem, have an acceptance of diversity, and possessed of a global orientation."

Psychologists often talk about the opacity and transparency of computers. Opaque computers and interfaces mask the inner workings of the machine. Transparent interfaces reveal the computer's processes and the underlying software. The step beyond those psychological terms is what Don Tapscott calls, "ultimate transparency." This is when the user is taken down to the ones and zeros of programming or the underlying workings and become one with the machine without giving the interaction much thought. To get the

most out of a device, leading thinkers point out that already "many children seek transparency – they want to know how computers and software work and to be able to change and modify these things."[98]

The Net Generation looks at computers the same way boomers look at television. Living in a society that has been diffusing the innovation of television for over sixty years, we do not marvel at the technology or wonder how television transfers video through thin air, we simply watch the screen. Television has become a fact of life, just as N-Geners are with computers and the power of the network. Using the Internet and advanced means of communications is something that occurs in the normal course of the day. "Because children growing up today are born with technology, they assimilate it. Adults must accommodate it – a different and much more difficult learning process."[99]

As technology grows in interconnectivity, applications, and the number of users, transparency grows with technology along with less intrusive interfaces required to operate such technology. However, as new communication technologies lead to growth in content, connectivity, applications, and user populations, a new kind of transparency is emerging as well. Growing adolescents will begin to not see the technology at all. The only things they will see are the people, information, applications, services, friends, and protagonists served by the technology. They do not see a computer screen or a cellular telephone, they see an easy way to talk with their friends, communicate with their social groups, find information and entertainment sources, and even earn a living. The fact that

the cellular telephone is quickly becoming a communication-friendly personal computer with today's teenage population is in itself leading to the transparency of technology.

Net Generation consumers already have a big impact on marketing because of their substantial purchasing power and influence on adults. As today's young become adults, they will drive commerce for decades because of their sheer numbers[a] and their simultaneous growth along with growing communications and information technologies. We can forecast much from their culture regarding how N-Geners currently regard products, services, and markets. Several trends that the Net Generation have been observed to follow are actually quite telling of the American population in general.

For instance, current real estate and restoration services are transforming homes into nerve centers for connectivity. New "smart homes" are being pre-wired with fiber optics to deliver the bandwidth to power the multimedia demands of the next decade. As people grow with the network offerings, the network will become ingrained in the lifestyles of the growing population. The N-Gen will want flexibility of work location, with offices closer to, or in, the home. Expect growth in smart communities, which include local commercial offices like "telework centers," which will be connected to smart home and retail businesses. Rural and suburban life will not suit the tastes of N-Geners, so there could be a growth industry in the conversion of urban office space in living space because they're not going to be enthusiastic about commuting back and forth from what distances remain between work and home. A lot of research and experimentation has

[a] The Net Generation represents 30 percent of the 2000 American population, compared to the boomer's 29 percent.

gone into telecommuting, so expect N-Geners to work from multiple locations: home; a local telework office (for shared physical resources); the company office or laboratory; a customer location; or vacation property.

The biggest generation ever is approaching the driving age. These young people will not only look for a great car with great technology, but also great services provided by the car. The car will be a place for entertainment, learning, work, and escape. And speaking of escape, when a network user performs a virtual fly-over of the ancient Incan ruins of Machu Picchu, that knowledge of seeing the ruins online does nothing to reduce interest in going to Peru, the knowledge increases the desire. In fact, the "search for authenticity will drive much of N-Gen travel in the future."[100]

Several potential downsides of the Net Generation is the promotion of multiple selves through virtual communities, the loss of social skills, diminished attention spans, vanity, and being stressed-out. However, becoming "net addicted isn't one," says Sherry Turkle, MIT psychologist and professor of the Sociology of Science. Turkle uses the analogy of heroin, something to which one can become addicted. "Unlike the digital media, no one can be said to use heroin to learn and work through problems and explore different aspects of their self. The drug takes away your ability to work through issues. It does not empower you to confront, learn, and deal with you issues in a constructive way." Using the Internet and gaining exposure to all the benefits will outweigh the negatives, and such a positive outlook will ensure the Internet's diffusion into the Net Generation. Living

with technology is like living with other aspects of life – it is all about finding balance, and N-Geners show a remarkable ability to self-correct. [101]

3.4.2. The Role of Educational Institutions

The Net Generation and the generation that follows will be born into drastically different societies that anyone living today can imagine. As recent trends suggest, the role that education plays in a growing person's life is evolving too, mainly because of the lifestyles and character of today's families. Maryland Senator Barbara Hoffman says that Americans have unfortunately begun to "depend more on schools to do the duties that families are not taking time to teach their children."[102] She says, "Schools have become the places where we as a society have depended on other adults to do some of the jobs that parents should be doing instead."

Some say that schools are moving marginally into the personal lives of students, which are not in step with the original purpose of the school. Such topics include classes devoted to teaching how to avoid AIDS, how not to drink alcohol, how to drive, how smoking is a bad habit that causes cancer, how not to use drugs, and recently, how to use a gun safely. Hoffman thoroughly agrees that schools are doing more than just educating, adding that "part of the role of the school in recent years has been a place where society has come to depend on the school to do some of the roles of parenting."

For instance, in a society where guns are becoming more a part of society than a part of family, social policy should be put in place to heed the changes to family life. In a family that hunts, the father is traditionally the teacher of gun safety. However, for a family in suburban and urban settings, guns may be more prevalent in the child's circle of social influence than the child's family setting. Granted, parental guidance should be the predominant source of influence and guidance on a child, but in certain situations, society-at-large should provide reinforcement within the child's circle of influence.

The decline in Parent Teacher Association (PTA) membership over the past several decades reflects many parents' disengagement from their children's schooling. That decline is unfortunate, because research suggests that when parents and the wider community work with schools, students benefit in concrete and measurable ways.[103] Due in large part to technology, the ties that bind families together today is much different that any time in the past. If not for advancing information technology, children would perhaps go to bed soon after dark because of no televisions around or no video games to play. Now children are connected more with their social groups outside the home than ever before. While parents are more engaged in earning money to pay for the wants of the family, the children have more free time to play with the wants of the family.

While lifestyle change appears to be moving in the direction one would least hope, school classes that should serve as bonding sessions in the home are instead becoming institutionalized rites of passage for today's youth. To present moral issues as a set of rules, educators essentially establish breaking points for rebellious youth to aim for. For a

strong generation, parents must return to the role of providing leadership and character development for their children.

Statistically, the correlation between "high social capital and positive child development is as close to perfect as social scientists ever find in data analyses of this sort."[104] In fact, the quality of development and education a child receives in school is a direct reflection of the type of environment a child is surrounded with through the school years. Communities that score high on Social Capital Index – that is, communities whose residents trust other people, join organizations, volunteer, vote, and socialize with friends – are the same communities where children flourish, tend not to become parents, drop out of school, get involved in violent crime, or die prematurely due to suicide or homicide.

Sadly, in today's materialistic and time-sensitive society, some parents haven't the time or even the knowledge to be attentive to most of the needs of growing youth. Therefore, in a more networked society, planners of social policy should heed the signs of a changing society and apply policy towards localized lifestyles. Schools are held increasingly responsible for providing the social education and well being of children. In the future, it is essential that parents take the lead role for instilling character and moral standards in children as those children learn how to function in social learning settings.

Smaller private schools, home school associations, and now involved parents have the Internet to keep abreast with the changing values of society, and perhaps to even teach to trends occurring in larger private school and public school systems. Specialized teachers

could emerge to teach to millions of children, with educator supervision looking on, over public or private networks. If Emeril Lagasse and Martha Stewart are able to virtually visit homes around the world and teach adults how to cook, what is keeping an highly-regarded teacher located somewhere in Iowa to emerge as a predominant mathematics tutor for students; a personalized "Sesame Street," for instance.

Networking technologies also help level the playing field for in-class students to encourage increased class participation. Assistive technology now allows children with reading comprehension and written expression difficulties, for example, dyslexia and dysgraphia, respectively, to perform reading and writing assignments via text-to-speech applications, talking word processors, and graphic organizers. Therefore, children with learning differences are now able to learn and complete assignments along with their classmates as expectations for performance rise across all tasks for all students.

Because of the positive effects on social change, parental and community engagement are at the center of current efforts to improve the social aspect of schooling. The creation of charter schools and the provision of publicly financed vouchers for kids to attend private schools may serve as an attempt to give kids the benefit of the "communal orientation" that produces exceptional student behavior and performance.[105] If choice programs work, their success may be due both to the marketplace and to the magic of social capital. School reform initiatives may very well take on characteristics of the network by encouraging smaller, more communal classes incorporating the benefits of the interactive network to fortify the educational process. These smaller classes may have the

unintended result of increasing student and parental involvement in clubs, classroom activities, and governing bodies so that education reform could actually be an engine for increased civic engagement with the child as the central character.

3.4.3. Changing Social Patterns

The most important factor for declining civic engagement is what Peter Schwartz in "The Art of the Long View" calls "predetermined elements" in the form of generational change. This change is the slow, steady, and inevitable replacement of the civic generations by their less civically involved children and grandchildren. This factor alone may account for over half the decline in social involvement and community participation.[106] This section will close out the chapter while addressing many trends in preparation for Chapter Four, where the framework of the social structure will be examined to see how information technology is changing fundamental subsystems of group interaction.

When people start talking of the loss of community in society, the list of reasons for its changing face is able to start conversations among policymakers and academics, republicans and democrats, grassroots organizers and leaders of the nonprofit world. In *Bowling Alone*, Robert Putnam looks at the many factors and predetermined elements leading to the fact that Americans have become less engaged in politics and community life than every before.

From a group participation standpoint, social capital in the shape of formal organization, such as labor unions, have seen a dramatic drop off since their peak in the mid-1950s, where 33 percent of the workforce was unionized. In 2000, that number is closer to 14 percent as oligarchy, apathy, and various forms of corruption have plagued unions as well as "other social networks of reciprocity."[107] Not only internal problems, but during that same time span, America has seen the rise of the service economy – a bleaching of blue collars into white collars – and a reduced dependency on manufacturing labor as the rigorous working conditions of the past were symbolized by the need of unionized workforce.

Changes in the character of work might mean that the workplace itself could account for a greater attribution of the loss of social interaction. After an entire day spent plowing a field, a farmer of ages past might welcome a church gathering or a square dance in someone's barn. Nowadays, many people work in large, complex organizations and spend most of the day preparing for and rushing to meetings with other people. The last thing on our mind when we get home in the evening is spending time with more people. Also, the suggestion has been made that a "shift has occurred between residence-based and workplace-based networks, a shift from locational communities to vocational communities."[108] That is to suggest that since more of us are working outside the home today than a generation ago, perhaps we have simply transferred more of our friendships, more of our civic discussions, and more of our community ties from the front porch to the water cooler.

While employment-related community involvement is changing due to the changing workplace, our real concern should be the sharp diminishment of social capital, exemplified by voter participation, club meetings, voluntary groups, church functions, and visits with friends and relatives. This downturn is "turning the average American into an island in a sea of alienation. It is sounding the death knell of the voluntary spirit championed by Alexis de Tocqueville[a] as well as every social scientist who came after him."[109]

Throughout this latest available publication concerning social capital and civic involvement, Putnam is relentless in proving his point about the decline in social capital, and through out much of his analysis he is convincing. He argues that although the number of nonprofit organizations grew from 10,299 in 1968, to 22,902 in 1997, these groups are not bringing about stronger community ties. To be a member of Greenpeace or the National Audubon Society, one need only write a check. Memberships are kept high at the Sierra Club not thorough public hearings or demonstrations but through the aggressive tactics of lobbyists, whose chief tool is the direct-mail campaign.

Equally depressing is that the most innovative and popular voluntary organizations in the late 20th Century were self-help groups such as Alcoholics Anonymous and Gamblers Anonymous and neighborhood crime watch associations, a finding that underscores the emergence of a silently troubled, and even alienated society. These types of groups are a

[a] French politician, traveler, and historian. After touring the United States (1831-1832), he wrote *Democracy in America* (1835), an impartial and widely influential study of American institutions. He believed that political democracy and social equality would eventually replace aristocratic institutions.

far cry from the Red Cross and the American Legion, created by the "long civic generation," which is a cohort of men born between 1910 and 1940, who Putnam shows voted more, joined more, and trusted more than either the baby boomers or the Gen-Xers.

The archetypical male is the family backbone, and when the male is socially weak or a non-factor in the family, the family structure will be weak. Putnam says the American family structure has changed in several important and potentially relevant ways over the last several decades. Since the family itself is a key form of social capital, perhaps it is part of the explanation for the reduction in joining and trusting in the wider community.

Much of the breakdown of the family is blamed on increasing divorce rates, and the more recent increase in single-parent families, which have doubled since 1950. In fact, the U.S. Census Bureau reports that the percentage of adults who are both married and have kids at home was sliced by more than a third from 40 percent in 1970 to 26 percent in 1997.[110] Marriage and children change the kinds of social networks to which adults belong, which increases time spent in informal socializing. "Only two types of organizational affiliations, however, are sufficiently strongly related to marital and parental status to make a real difference in the aggregate: church- and youth-related activities."[111]

While no one single factor can be attributed to the downtrend in civic engagement, Putnam offers strong arguments for many important factors. Pressures of time and money, including the special pressures on two-career families, where two parents still exist, contributed measurably to the diminution of our social and community involvement

during the 1960s to the 1990s. Putnam's "best guess is that no more than 10 percent of the total decline is attributable to that set of factors," while suburbanization, commuting, and sprawl also played a role.

Many observers believe that civic disengagement is because of big government and the growth of the welfare state. Why go to the local church or the local non-profit community organization when the government will use tax dollars to subsidize any urgent need. Tax incentives for civic philanthropy have essentially crowded out private initiative and such state intervention subverts the civil society.[112] Therefore, with the growth of the welfare state and an already downward trend in civic participation, communities are losing the teamwork characteristics that help keep communities strong since the dawn of civilization. Now, add to those trends the increased reliance on the Internet for employment, services, information, entertainment, and an impersonal outlet for expression, one would be easy to guess that community involvement seems destined for disappearance.

To help plan for changes in the coming years, Chapter Four will present a model for planning future social interaction with the existence of interactive networks. Because the Internet is having such a huge impact in the way people conduct business, earn a living, seek entertainment, and interact with other people, the Internet is destined to have a lasting impact on future social participation in physical communities.

CHAPTER 4

THE HUMAN/NETWORK INTERACTION (HuNI) MODEL

4.1. Human Interaction

With earlier chapters, we have seen how the public networks, known as the Internet, and private networks, known as intranets, are leading to change in major sectors of the economy. So much change is occurring in that way the business world that this period of transition will be regarded as the beginning of the Network Economy. However, change is not only for the business sector. Along the same lines, entertainment, employment, and personal wireless devices will have planners and sociologists abandoning traditional means of understand and predicting social patterns in groups, perhaps blending distinct cultures and changing public participation patterns. So much anticipation surrounds the Internet that many researchers now consider the social diffusion of this communications phenomenon as the beginning of the Network Society.

Because the Internet, along with countless numbers of private networks, are becoming such a powerful force in the social interactions of human beings, a new model can be offered by combining the common features of the biological systems paradigm and the computer networking paradigm. The Living Systems model provides the underlying framework of communities and social building blocks, and gives a guide for how people and social groups are enabled and sustained. The prevailing computer networking

paradigm, the Open Systems Interconnect (OSI) model, provides networking professionals the underlying framework for building out efficient computer networks.

The common feature of each model is, of course, human interaction. Future community and social interaction in community may be a function of the ability of networks to facilitate community in many social groups. Networks remove barriers of time and space – the same items regarded at a premium by rising numbers of the population. By offering a new paradigm of human social growth around traditional networking growth, planners of society may be able to successfully predict change and better implement policy to guide appropriate change in communities of any size.

Building on trends presented in previous chapters, the HuNI Model will suggest that a large percentage of subsystems of human social interaction could soon be replaced or improved upon by the use of network communication and network-mediated decision making processes encountered in everyday life, perhaps creating a new social order of human beings and human society.

4.2. Living Systems Model

We live in a world of systems. The communities in which humans live are a complex system of natural and built environments, and we build towns and cities that work as systems. We have mechanical systems like computers, cars, and automated factories. We talk of political systems, economic systems, and belief systems. Each system works as a

complete functioning whole that combines many separate parts. However, there are limits to how big a system can grow, everything else being equal, at a certain point the system will become unwieldy, hard to manage, more prone to breakdown, or grow inefficient. Therefore, as systems grow bigger, it makes sense to divide them into smaller systems and establish different levels of control. In the book, *The Art of Systems Thinking*, the authors define a system by these five criteria:[113]

- Interconnecting parts functioning as a whole;
- System outcomes change if you take away pieces or add more pieces. If you cut a system in half, you do not get two smaller systems, but a damaged system that will probably not function;
- The arrangement of the pieces is crucial;
- All the parts are interconnected together;
- System behavior depends on total structure. Change the structure and the behavior changes.

The economy and the world of business is not the only systems in America. The multitude of ways Americans earn a living is changing. Through telecommunications, Americans who live in rural areas are spending more of their free time connecting to people who live outside their neighborhood. In the book, *Bowling Alone*, Robert Putnam examines many factors of social involvement in the American community and presents trends from recent years that show typical community interactions are in a state of decline. Is the value of community diminishing? Because of increasing government and

civic services such as utilities, police and fire protection, and social services such as meals-on-wheels, is it possible that people do not need as many extended family members and neighbors as in the decades before? Are people so busy with their changing lifestyle that services are replacing the in-kind services originally offered through community?

We must first examine the defining social model of groups, and the defining network model that is driving the social network system. After looking at the social model in this section we will look at the existing computer networking model. By combining both the social and network models, we may begin to realize a need for a model that defines society with respect to an ever increasingly prevalent network model. The Human-Network Interface (HuNI) Model is proposed to frame such anticipated change.

The information presented in this section is taken largely from *Living Systems*, a work by James Grier Miller. His work presents and analyzes many diverse facts about the building blocks of biological systems. He begins with the smallest biological system, the cell, and moves through all the stages of biological organizations through organs, organisms, groups, organizations, societies, and finally with supranational systems. For purposes of the thesis, this section will focus primarily on the interactions between organisms and groups to establish the communication linkages between individual members of a society, the organisms in the group, in order to show an inflection point where network communication will satisfy a niche within the human social system.

The following three sections highlight each of the nineteen subsystems that are required to insure the well being of a biological society – a family, a meeting, a workgroup, and other forms of groups. If the needs of each of the following nineteen subsystems are met, which for the purposes of this thesis are broken down into three categories of control, the system will continue successfully. The three categories of Living Systems are grouped into information processing subsystems, matter-energy[a] processing subsystems, and matter-energy and information processing subsystems.

4.2.1 Matter-Energy and Information Processing Subsystems

In Table 4-1, we see the only two subsystems of social interaction throughout Living Systems that require both the process of matter-energy and the transmission of information.

Table 4-1 Subsystems that Process Both Matter-Energy and Information

Reproducer	Gives rise to other similar groups within the group or the group as a whole
Boundary	Holds together the components of the group which make up the system, protects them from environmental stresses, and excludes or permits entry to various sorts of matter-energy and information.

[a] Miller combines these two elements: Matter is anything that has mass and occupies physical space; Energy is defined in physics as the ability to do work. Living systems need specific types of matter-energy in adequate amounts in order to sustain life. Heat, light, water, minerals, vitamins, foods, fuels, and materials of various kinds are required to sustain life.

The *Reproducer* for a group of people may be the people or subgroup that produces the charter for a new group, or the group that nominates a new chairperson, or the election process for a new president or mayor. The *Boundary* subgroup is responsible for protection or matter that provides a sense of unity, such as police or fire departments, or possibly a room, fence, or wall. Again, this subsystem processes both matter-energy and information, which means that if a virtual community is able to process these two things, such collection of matter-energy and information constitutes the necessary processes to become a society. As time passes, one might argue that this will be the last subsystem to completely change from increasing communications technologies. One might also argue that for these two subsystems of Living Systems to change would lead to question the humanness of the group being represented.

However, Miller says that all groups have boundaries. He says the boundary is a "subsystem at the perimeter of the group that holds together the components which make up the group, protects them from environmental stresses, and excludes or permits entry to various sorts of matter-energy and information."[114] He associates boundaries to the spatial extent of a group's domain within various groups, from tiny insects, to a herd of whales, to astronauts who form a group with ground control. With his statement, "the largest human group might be astronauts in a space vehicle who, links through space by radio, form a group with their ground communicator"[115] he is implying that in order to form a group, or a society, each organism within that society do not need to be physically bound together. Radio contact, in essence virtual communication, allows a society to form.

As of the late 1990s, many studies in the fields of virtual communities have been performed. While one can certainly envision an evolved world where brain power and total connectivity could possibly be enough to sustain life, my personal belief is that ubiquitous communication will never totally replace physical community. I believe that too much of what humanity learns, knows, and passes on has to do with actual physical, interpersonal relationships. However, it bears worth pointing out that *Living Systems*, which is a well-accepted piece of biological systems literature, says that technology is a unifier of organisms and that more than a collection of organisms is understood to be a group, or society. With that, the assumption can be made that better communications through technology could bring together many organisms to the benefit of the beckoning group or organism.

4.2.2. Matter-Energy Processing Subsystems

The next eight subsystems of social interaction, as presented in Table 4-2, require only the process of matter-energy. These subsystems bring foreign material into the system and aid in the preparation of such material for use by the group.

The *Ingestor* is the subsystem to bring material to the group as in the gatherer of firewood, or the person who acquires and brings food for the group. The *Distributor* is the worker insect, the person who passes out tools to members, workers on an assembly line, or artifacts such as a delivery truck. The *Converter* is another worker group in that

Table 4-2 Subsystems that Process Only Matter-Energy

Ingestor	Brings matter-energy across the group boundary from the environment
Distributor	Distributes outputs from other subsystems to organisms in the group
Converter	Changes inputs into forms more useful for special processes in the group
Producer	Provides outputs for the group
Storage	Retains matter-energy in the group
Extruder	Transmits matter-energy out of the group in forms of products or waste
Motor	Moves the organisms in relation to its environment or each other
Supporter	Maintains spatial relationships among organisms so they can interact without weighing each other down or crowding each other

they process outputs of the Ingestor. This subsystem includes the chopper of wood, grinder of corn, butcher, and includes the tools and machinery used to process the material. This subsystem's outcome is upwardly dispersed to a higher level of processing as applicable. The *Producer* subsystem is another worker, perhaps as a cook, a repairer, a maker, machines, books, or tools. This subsystem's outcome is upwardly dispersed to a higher level of processing as applicable with the supra-system. The *Storage* subgroup is like a stock clerk, or a spare-parts dealer, or the family member who retains, for different periods of time, deposits of food or other various sorts of useful material. Of course, this subsystem may either be laterally dispersed to some or all members of a group, or upwardly dispersed as a factory or city that stores matter-energy such a utilities or supplies. *Extruder* is the subsystem that includes janitorial duties, police service, or a bouncer at a nightclub are extruders in human groups. Artifacts for this subgroup include such items as a wastebasket or a prison. The same applies to delivery people and

salesmen who arrange for extrusion from other subsystems, even if the products are information oriented, in which case the act would also act as the output transducer in the information processing subsection in the next section.

The *Motor* subgroup for humans would include the act of physical mobility as well as people in the group responsible for group mobility, such as pilots and drivers. Artifacts include such items as a bus, an airplane, or other laterally dispersed transport device for members who move jointly. Within human groups, motor coordination is achieved by exchange of information (agreed upon destination, maps, interactive radios) while other classes of biological systems may organize through instinctual patterns, such as the migratory patterns of birds and the swimming of fish in schools, which appear to move as a unit. Movements of a group may also be used for output transducing, as when a marching band spells out words or when a group presents a play or operates a television station. A *Supporter* is any subgroup that maintains spatial relationships and materially supports others in the group. Artifacts for this subsystem include a nest, a house, a car, or furniture. This subgroup can include support members that maintain relationships among members in the group, such as social organizations and support groups.

4.2.3. Information Processing Subsystems

The next subsystem groups the nine subsystems of social interaction that process only information. These subsystems bring information into the group or aid in the presentation of information to external systems. While communications technologies will have an

increasing effect on all Living Systems, because these subsystems process only information, this is the subsystem that communications technologies will directly influence first, and perhaps deal the most social consequences.

As shown in Table 4-3, the *Input Transducer* is the subsystem that acts as lookout or scout. This group member may change matter-energy written words to informational spoken words. Artifacts in this group are a television or radio. *Internal Transducer* is the subsystem that receives information from others in the group and conveys to the group decider that information about the group tasks, or about internal states of group members as they interact, including their feelings about group processes. *Channel and Network* is considered any group member who communicates to one of more other group members. Includes such artifacts as paper with written messages, telephone, email and other means of telecommunication. *Decoder* is the subgroup which acts as a guide, interpreter, expert, or a companion of the physically or mentally challenged. *Associator* is a laterally dispersed output to some or all members of the group who associate information or skills for use by the group. Artifacts in this subsystem include the computer, which may be able to do some associating for the group. The *Memory* subsystem may be the elderly animals in herds, or parents or grandparents in families, or secretaries of committees. Artifacts of this subsystem include banks, photographs, written minutes, nostalgia, recordings, computer, or money. The *Decider* is usually the decision maker in the group such as a father, supervisor, president, chairperson, or other specialist depending on the type of decision to be made. There is no mention in *Living Systems* of artificial intelligence systems; however, if later editions were available one would assume with confidence that

Table 4-3 Subsystems that Process Only Information

Input Transducer	Brings markers bearing information into the group, changing them to other matter-energy forms suitable for transmission within the group
Internal Transducer	Receives markers bearing information about significant alterations in subsystems or components, changing them to other matter-energy forms which can be transmitted within the group
Channel and Network	A single route in physical space, or multiple interconnected routes, by which markers bearing information are transmitted to all parts of the group
Decoder	Alters code of information input to it through the input transducer or the internal transducer into a private code that can be used internally by the group
Associator	Carries out the first stage of the learning process, forming enduring associations among items of information in the group
Memory	Carries out the second stage of the learning process, storing various sorts of information in the group for different periods of time
Decider	Receives information inputs from all other subsystems and transmits to them information outputs that control the entire group
Encoder	Alters the code of information input to it from other information processing subsystems in order to convert a private code into a public code
Output Transducer	Puts out markers bearing information from the group, changing markers within the group into other matter-energy forms that can be transmitted over channels in the group's environment

this subsystem would include such decision-making systems. *Encoder* subsystems compose letters, speeches, or statements presenting the views of the group. *Output Transducer* subgroups are the means by which the encoder subsystem relays the message, such as through the spokesman, the publicity agent, chairman, or department head, and include such artifacts as telephone, radio, television, and of course, the information network. The similarities between the information processing systems of living systems have an astounding similarities to the information processing systems of computer networking technologies, which we will see in the next section.

4.3. Computer Network Systems Model

Every biological process outlined by the Living Systems model in the previous sections can mesh within a network computer model. In fact, the field of Cybernetics focuses on how a system functions, regardless of what the system is – living, mechanical, or social.[116] In 1950, Norbert Wiener, who is considered the father of the field of Cybernetics wrote, "A society can only be understood through a study of the messages and the communication facilities which belong to it; and in the future development of those messages and communication facilities, messages between man and machines, between machine and man, and between machine and machine, are destined to play an ever-increasing part."[117] Weiner proposed the same general principals that control the thermostat might also be seen in economic systems, market regulation, and political decision-making systems.[118] O'Conner and McDermott say that systems and cybernetic ideas, having made such an incredible difference to our material lives, will now start to make a difference to our mental lives as well.[119]

The International Organization for Standardization (ISO)[a] developed the Open Systems Interconnection (OSI) model for computer protocol architecture as a framework for developing protocol standards when networking two or more computers, or other network devices together. The OSI Model uses the structuring technique known as layering because the communications functions of computer networks are partitioned into a hierarchical set of seven layers.

[a] ISO is not an acronym, but a word derived from the Greek "isos," meaning "equal."

Each layer performs a subset of the functions required to communicate with the next higher or lower layer in achieving the overall task of sending data to another distant computer system. The OSI Model relies on the next lower layer to perform functions that are more primitive and to conceal the details of those higher functions, and consequently, provides services to the next higher layer. Thus, any problems are readily decomposed into a number of more manageable sub-problems.[120] In short, if you want a network device to work with any other network device, the OSI Model is where you start.

Actually, to people unfamiliar with computer communications systems, the OSI Model offers a simple way to grasp the regimen involved in electronic communications. Table 4-4 illustrates the seven layers, from top to bottom, with a brief description of what each layer represents.

For people not well versed in networking technologies, an excellent way to think of the OSI Model would be to think of the steps involved in completing a regular telephone call. Imagine picking up the handset and listening for a dial tone (physical layer). In dialing a telephone number, every digit moves the call another link closer to the destination (data link); listening for the ring from the remote telephone constitutes a (network) connection and transmission (transport) of voice. Getting someone on the line, the caller has just completed the bottom four layers of the OSI Model. Moving from bottom of the model to the top, then the initial words of "Hello" begins a (session), the choice of English defines

Table 4-4 The Open Systems Interconnect (OSI) Model

OSI Model	
Network Subsystem	**Subsystem Characteristics**
Application	This is the user interface layer. Human input is needed to initiate processing or data transmission requests. Represents the services that directly support applications such as software for file transfers, database access, and electronic mail.
Presentation	Translates data from the application layer into an intermediary format. Manages security issues by providing services such as data encryption, and compresses data so that fewer bits are needed to transfer through the network. Performs behind the scene duties for the application layer.
Session	Allows two applications on different computers to establish, use, and end a session. Establishes dialog control between the two computers in a session, regulating which side transmits, plus when and how long the network device transmits.
Transport	Handles error recognition and recovery. Repackages long messages when necessary into smaller packets for transmission and, at the receiving end, rebuilds packets into the original message. The receiving transport layer also sends receipt acknowledgments to the sender.
Network	Addresses messages and translates logical addresses and names into physical addresses. Determines the route from the source to the destination computer and manages traffic problems, such as switching, routing, and controlling the congestion of data packets.
Data Link	Packages raw bits from the Physical layer into frames (logical, structured packets for data). Responsible for transferring frames from one computer to another, without errors. After sending a frame, it waits for an acknowledgment from the receiving computer.
Physical	Transmits data bits from one computer to another and regulates the transmission of a stream of bits over a physical medium. Defines how cables are attached to network adapters and what transmission technique is used to send data over the medium.

the (presentation), and the human input of conversation constitutes the (application) layer. The hang-up terminates the session for both devices.[121]

In standardizing networking protocols, the task of ISO was to define a set of layers and the services performed by each layer. The standard partitions group functions logically, and has enough layers to make each layer manageably small, but does not have so many layers that the processing overhead imposed by the collection of layers is burdensome for computer processing. The intent of the OSI Model was so that different protocols could be developed to efficiently perform the functions at each layer, relieving the other layers from performing multiple functions, which could consume what was once considered scarce computer processing resources.

The OSI Model has been the model that makes the Internet and all forms of telecommunications possible. Without the layers, every supplier of equipment would have to comprehend all the functions, codes, and interactions of the entire system. The layers are the subsystems of the Internet system. However, as George Gilder points out in *Telecosm*, we may begin to see a shrinking of the OSI Model soon.

As fiber optics begin to take precedent over the backbone of the Internet, the fiber will allow for a collapse of the bottom five layers of the OSI Model. "Dumb networks" will allow for instantaneous travel of data between two nodes in the network that will put more onus on the Session, Presentation, and Application layers of the OSI Model to decipher which data packet belongs to which terminal address. In essence, Gilder sees a

corporate course that will encourage a flatter OSI Model with "dumber [highways] and faster traffic cops above."[122]

Building on the ideas of a flatter, and faster, networking model, networking will go the way of other technologies in that as technology gets faster, the technology is often pushed aside. Because humans are the bearers of the impacts of faster telecommunications, the next section will detail the idea of combining the flatter OSI Model with the increased human interaction of the Living Systems model. With advancing user interfacing, over time human interaction with networks may become a second nature of sorts for humans. I will build on the flatter OSI Model with an expanded human layer to include facets of the Living Systems Model to create a new model for human and network interaction. After all, with faster networks connecting people and machines together in Internet time, people and the social subsystems they represent will be making decisions and responses in earth time faster.

4.4. Human/Network Interface (HuNI) Model

Norbert Wiener said, "the operation of the living individual and the operation of some of the newer communication machines are precisely parallel."[123] He explains by pointing out that "both of them have sensory receptors as one stage in their cycle of operation: that is, in both of them there exists a special apparatus for collecting information from the outer world at low energy levels, and for making it available in the operation of the individual or of the machine."

For philosopher Warren McCulloch, cybernetics was an experimental epistemology[a] concerned with the communication within an observer and between the observer and his environment. In both cases, "these external forces are not taken pure, but through the internal transforming powers of the apparatus, whether it be alive or dead. The information is then turned into a new form available for the further stages of performance. In both the animal and the machine this performance is made to be effective on the outer world, and not merely their intended action, is reported back to the central regulatory apparatus. This complex of behavior is ignored by the average man, and in particular does not play the role that it should in habitual analysis of society."[124]

Now, surely with the late Wiener's appreciation, the average person no longer ignores the growth of the Internet and network-mediated communications. Computer networks have created such a change in daily life that an increasing amount of study is being applied to technology's role in an almost-cybernetic society. As we have seen with the Living Systems Model and the OSI Model, human interaction plays a very important role in the way people communicate with other individuals and in groups of people, both over machines or in person. We have seen that technological innovation and the advancement of society are functions of each other. Community is a social meta-system, and within it contains relational systems such as commerce, education, entertainment, and others as we have seen in previous chapters. Binding these community systems in increasing capacities are the information systems of computer networks.

[a] The branch of philosophy that studies the nature of knowledge, its presuppositions and foundations, and its extent and validity.

In fact, the two systems seem so interrelated that soon the paradigm of one system will soon be the dominant influence of the other. For instance, the needs of people and society will be met by computer-networking technology and their interface devices, thus individuals will be determining the growth and proliferation of networks and the evolution of the OSI Model. In addition, the Internet is a facilitator, not an entity into itself as it must have ties to the physical (matter-energy) environment. Because the use of increasing technologies will have such a profound change on the way people interact in society, a new system could evolve from the current Living Systems model and OSI Model. Because each system has such a growing influence on the other, a new model is proposed to plan the growth of human and network interaction, the Human/Network Interface, or HuNI model.

The merging of the two models may indeed provide a framework for determining such social group change. The remainder of this chapter will discuss the step-by-step transformation from two models to one convergent model. However, before we begin the discussion of the HuNI model, we must first discuss latest trends and advancements in computer interfacing.

4.4.1. Human/Network Interface Devices

Even though technology at-large was discussed in a previous chapter, I think it is important to discuss human/network interface devices now because of the level of

relevance and importance the network interface provides in the HuNI Model. In essence, the network interface device is the physical device that a human is in contact with while virtually connecting two people, two groups of people, and connecting people outside the group with the groups they belong. The human/network interface is the "glue," if you will, that joins humans with networks, and subsequently, with other people through the communication offered. As development of interface devices evolve, the device will help push the technology deeper into transparency as people begin to exploit the advantages of the network throughout their daily lives.

With network communications becoming an integral part of everyday life for people, the "edge of the network" may move beyond what has typically been known as the desktop computer and move to smaller, portable, handheld devices. With people becoming more connected with the network each day, networks are becoming more pervasive, and with people interacting through wireless devices to remote computers and distant humans alike, the edge of the network is becoming people, which carry around the network devices with them instead of the computers they used to sit behind.

No longer must people be constrained to keyboards or a mouse to interact with computer applications. User interfacing is advancing at a rapid page, voice recognition is becoming a viable input mechanism for computer applications, and handheld computers are accepting handwriting as a form of input as opposed to typing. In fact, if "Graffiti"[a]

[a] Graffiti is the trademark given to the popular stylus-based writing input of the Palm Operating System.

handwriting continues growth in popularity, perhaps computer recognition standards will eventually lead to an evolutionary change in the way people write.

Jef Raskin, the creator of the Macintosh at Apple Computer, says, "anytime you make a system faster to use, easier to learn and less frustrating, there are psychological benefits to the individual user."[125] To prove that the market for handheld devices is ready to grow, Raskin says, "We have gone to the leveling off portion of the S-curve of personal computers. The exciting, exponential growth phase is over. But a new interface that truly integrates PCs, [handhelds], wireless, and the Web could start up the growth engine all over again."[126]

In fact, Commentator Douglas Rushkoff makes the plea to manufacturers of network interface devices to develop products that will bring technology to the human being and not force humans to make a fit with technology. He says that we need to consider a new way to view the relationship between humans and their machines. Most companies, he argues, ignore the way people actually use technology and that today's interfacing is not developing the way user interfaces need to be developed. "Streaming media companies are trying to make the computer a television or a movie screen, but movies were meant for the television and movie theatres. The web on the PC was meant for browsing, the web on a cellular telephone was meant for to-the-point instructions through menus and simple interfacing. Companies will finally understand that they can't simply shrink the web onto tiny handheld screens."[127] Thus, with advanced user interfacing, product developers are bringing technology to the human.

Developments in user interfacing include eye-activated applications, such as retinal scanning. The University of Washington's Human Interface Technologies Lab has already developed retinal displays in use by fighter pilots and neurosurgeons. Dr. Thomas Furness, director of the lab, is readying these displays for use on consumer wireless devices in as soon as five years. Retinal scanning, unlike a LCD[a] panel in front of the eye, paints images onto the retina itself. Images produced by retinal scanning displays remain stable even when there is head movement, unlike with LCDs. "It very efficient in terms of coupling with the eye," Furness says.[128]

Future devices will integrate biometric functions to offer a host of valuable capabilities. Devices will track eye movements and recognize exactly where in the display the user is focusing. Imagine opening an address book entry by looking at it for a second, and then glancing at a trashcan icon to discard an outdated number or address. By combining eye-tracking capability with voice recognition, even the smallest mobile devices can be used for such complex tasks as document creation and Web browsing. As one industry player says, "as the displays get smaller and affordable for the consumer market and is married with the appropriate applications, that's when the market really takes off."[129]

Changing the way we relate to our computers will require a fundamental shift away from the keyboard and the ideas of a clunky personal computer. Most user interfaces on the horizon focus on speech recognition capability, as voice plays an important part in

[a] Liquid Crystal Display

developing ubiquitous, or pervasive, computing. Ubiquitous computing builds on an environment in which human-network interaction is no longer tied to a single device such as a keyboard. Considering that network devices are shrinking in size, consuming less power, and becoming wirelessly embedded in appliances, furniture, and clothing will make communicating via the network a somewhat transparent endeavor.

The wired world will morph into the unwired world, as the network evolves from a place inside our personal computers to a place inside our consciousness, redefining our perceptions of community and commerce. In the future, communicating over the network will be as easy as wearing glasses, or having retinal implants that allow you to look at a certain spot in the field of vision and contact someone else. Of course, the user won't be wearing the actual computer, but the wireless devices will connect with a remote computer which will serve up the applications you request as you move around the wireless network – which could be your home, your town, or someday around the world.

For years, networking professionals have assigned the all-encompassing moniker of "the edge of the network" to personal computers and personal network access devices. When a computer or networking company produces a product, the new product is ultimately a success if the company can achieve market penetration at "the edge of the network." From the looks of revenue, the edge of the network will allow biometrics to be in a position for a profitable run in the short years to come. While 1999 revenue for biometrics equaled about $58.4 million, in 2003, the market is predicted to increase to $594 million.[130] Wireless network devices will not be the computer, but they will have

access to software applications served through the network to the human, who will themselves become the "edge of the network."

Other interesting user interfacing possibilities have grown from biofeedback and stimulus response on the human brain. Doctors at Emory University Medical Center have successfully implanted in a patient's head, electrodes that capture impulses and translate them into software commands. Less intrusive brain-to-computer interfaces, such as helmets that harness brain impulses, are being developed at the University of Rochester.[131] What would happen if a human could send out brain impulses across the network to control a device in a remote location? To do just that, Duke University neurobiologists successfully transmitted brain waves from a monkey in North Carolina over the Internet to move a robot arm 600 miles away at the Massachusetts Institute of Technology.[132]

As evident from the examples above, the network is about to change the things we know about our communities and ourselves. Still yet, humans have the need for increased means of communication, and the innovative capacity of humans have allowed such development. Whether humans are going to become physical terminal devices for an infinitely expanding digital network remains to be seen, but if the capability exists to transmit monkey brain waves across the network to move a robot arm, some form of advanced human-network interaction could not be too far away. As mentioned earlier in this thesis, humans will only choose to adopt the technologies that will help them, so

ethical and moral standards will hopefully deter any horrific cybernetic science fiction notions in the future.

4.4.2. Blending Traditional Models

To help design a model of human-network interaction, we have thus far seen the Living Systems model and the OSI Model for computer networking. As mentioned earlier, in the age of infinite bandwidth, fiber optics and optical switching will flatten the OSI Model from the Session layer to the Physical layer. At the time of this writing, other high-speed networking technologies are being developed that will connect network devices faster than fiber optics, without wires, making for a truly ubiquitous network connection. Such technologies include wireless networking through wireless local area networks (Wireless LAN), point-to-point technologies using wireless optical devices (lasers), or global wireless with earth-orbiting satellites. Each system has their own drawbacks[a], but in time, the wireless network will converge all forms of wireless transmission.

Regardless of the type of user interface and the bandwidth supplied to the user devices, the Internet is becoming more transparent to the user. As the "new media grows in connectivity, content, applications, and user populations, a new kind of transparency is emerging."[133] Soon, network users will not see the technology at all. In fact, network users see only the people, information, games, applications, services, friends, and

[a] Currently, wireless local area networks (wireless LANs) are too limiting in their coverage area, point-to-point technologies are limited because of geographical and environmental constraints, and because of sheer distance needed in the transmission, satellite has time delay issues to overcome.

protagonists at the other end. They do not see a computer screen; they see friends' and coworkers' messages and information.

That very fact brings us to an important point in this section: As humans become more accustomed and adept at network interaction, the network will become a very strong outlet for social interaction and information. So much, in fact, that people will eventually accept the network as a component of life. In doing so, societies will quite possibly abandon the large component of the Living Systems social structure that process information. The startling fact is that nine of the 19 Living Systems subsystems, 47.4 percent, required by social groups can be replaced by the technology provided by computers and information networks. Such roles in community and groups could quite possibly be replaced by the endless amounts of information processing provided through the network. If social groups and community participation is further reduced by almost half in the coming years, considering an existing decline of community participation, will there be a post-Network Society void of community involvement?

The computer has long provided the technology to consolidate and automate many of the current information-only processing duties of the Living Systems model without human involvement. In fact, the growth of the network is further empowering the individual to perform information processing on their own via the networked computer to remove dependency on others in the group. As an added driver of change, wireless technology is further removing the barriers of time and space.

In the business sector, extra information can be stored as surplus, which be converted to profit. In the employment sector, more productivity means fewer workers are needed to perform tasks; all other factors remaining constant translate to increased efficiencies and greater profits with fewer people. However, in the group and small community, reduced reliance on other people in the group supports a trend for more self-sustaining individuals because of a reduced dependency on other members of the community. Therein lies the premise on which a new model for social interaction is proposed. Traditional social groups and community is changing due to communications and information processing technologies.

Whatever the transmission technology will be in the years to come, whether it will be something new or a generational development from existing technology, for the present time optical fiber is the fastest available transmission medium for high-speed interaction. With time, wireless transmissions will surpass the speed of current fiber optic cables, giving broadband capabilities to personal network access devices. Building on George Gilder's suggestion of a flattened OSI Model, which will be referred to as the Network layer, the modified OSI Model now looks like this:

Application
Presentation
Session
Network

Because the application layer is dependant on human input, the logical step above the application layer needs to be the Human Interface layer. Interactions include the passing

of information between the human and network, and between humans and the community. As noted earlier, speed of the processors and various throughputs along the network, the interaction of humans with the network and other humans will not only become faster, the interaction will become much simpler, creating a layer of technology transparency. However, the human interface of the Human Interface layer will be a physical artifact used to transmit information from a person through the network to another person or machine. The model now looks like this:

Human Interface
Application
Presentation
Session
Network

Because of increased speed and merging technologies, the Application, Presentation, and Session layers of the OSI Model can be divided into two main headings of Software and Hardware of the new model. The hardware, of course, is the physical devices that allow the communications and processing functions to operate with the bandwidth and provide inputs for the Software layer. The Software layer provides access to information along the network below and any encoding, decoding, storage, and other information-only processing needed by the group or individual through the Human Interface layer. The updated model now looks like this:

Human Interface
Software
Hardware
Network

Today, software performs the applications that process information through various inputs of data through spreadsheets, word processors, translation and encryption software, and provide various forms of processed information as outputs. Because the Software layer provides information processing and translating functions, the network could very well replace the nine Information Processing subsystems of the Living Systems model. The updated model looks like this:

Human Interface
Information Processing
Hardware
Network

As humans interact with other humans through machines, or interact only with machines in a matter that results in physical action, a functioning group can exist according to the research of Miller as presented Living Systems. That being the case, at the point where such network interaction displaces physical requirements in a group, the action creates the point of inflection at which the Living Systems model and the OSI Model merge. The transmission of information through the network has turned communication and information into action, virtuality into reality.

For information across the network that results in physical activity, the two subsystems of the Living Systems model that deal with the processing of matter-energy can be placed above the Human Interface layer. Such network connection and interaction forms a

group, as proven earlier. The Human/Network Interaction Model exists as below and detailed on the following page in Table 4-5:

Matter-Energy and Information Processing
Matter-Energy Processing
Human Interface
Information Processing
Hardware
Network

Table 4-5 The Human/Network Interface (HuNI) Model

Human/Network Interface (HuNI) Model	
Subsystem	**Subsystem Characteristics**
M-E and Info Process	
Reproducer	Gives rise to other similar groups within the group or the group as a whole
Boundary	Holds together the components of the system; protects from environmental stresses, excludes or permits entry to various sorts of m-e and information.
M-E Process	
Ingestor	Brings matter-energy across the group boundary from the environment
Distributor	Distributes outputs of other subsystems to the group
Converter	Changes inputs into forms useful for processes in the group
Producer	Provides m-e outputs for the group
Storage	Retains m-e in the group; guards against lack stresses
Extruder	Sends m-e out of the group as products or waste
Motor	Moves organisms in relation to environment or each other
Supporter	Maintains spatial relationships among organisms
Human Interface	
Physical	Relays processed information from software to members of group
Virtual	Relays information from individual to the group through software and network
Information Process	
Software	Performs information processing, translation, presentation, and other tasks from human interface and network; accepts inputs from human interface and prepares information for transmission
Hardware	
Hardware	Provides processing requirements for Software layer; prepares transmission of information from software through network; establishes link with remote device
Network	
Network	Accommodates the various transmission medium and provides bandwidth; determines routing of information

4.4.3. Applying the HuNI Model

Up to this point, the thesis has shown technological diffusion in society and how humans have allowed their communities to change due to the efficiencies and advantages created by advancing technologies. Chapters Two and Three discussed the changes in recent business and social environments like the corporate environment, the workplace environment, the local community, and the home environment. Chapter Four has provided a framework for applying these recent changes in social settings to a longer view of how advancing communications technologies could influence community through the replacement or substitution of information processing subsystems in a group.

The HuNI Model can help illustrate the process of interaction or even the increase in productivity of a social group. The required social interactions of a family can be applied to the functional implementation of the HuNI Model as one system of social interaction through the network. For instance, a woman can meet with clients to exchange information about an outsourced/contracted project for which she is part. While interacting with the clients, she can check the status of the project through her company's Enterprise Resource Planning (ERP) intranet server where updated and cooperative files are stored. After the meeting, she can schedule doctor appointments with the family doctor, coordinate preparations for the yearly community picnic, participate in a lesson at her son's school, all while spending time at home with her infant daughter. Unknowingly to her, the home network has detected an irregular cooling cycle in the family refrigerator

and the pre-arranged appliance service company is on the way to the house to repair the refrigerator before completely failing.

The above processes all illustrate the transfer of information between people in the family's relational boundary. The transfer of information enacted physical engagement on the both ends of the transmission, which allows the mother to interact more effectively and efficiently with her environment, in turn, increasing the family's productivity. Through the network she can participate in relational systems, go from one from role to another with relative ease, and get guidance on the systems of matter-energy processing that is associated with them. Through such interaction as suggested above, each subsystem was engaged in appropriate order to allow the human and network interaction to function in an orderly fashion. Most importantly, increased dependency on technology is decreasing the dependency on personal relationships with other people in the family's community.

The father need not be concerned with the refrigerator because the service company will repair it. The family does not need the services of a babysitter because the mother works from home, so transportation needs have been reduced as well. Through the network, the family is socially self-sufficient in taking care of the family's needs. This is good for family unit, but the effects to the value of community will be discussed in Chapter Five, as the HuNI Model will be applied to several areas of community planning.

CHAPTER 5

PLANNING IN THE NETWORKED COMMUNITY

5.1. Planning Issues

The Planning profession helps place perspective on humans and their essential social needs and gathering patterns. Humans by design are complex social creatures, consisting of many social subsystems. Since the beginning of human time, humans have gathered in groups to rely on interpersonal bonds of commitment to meet shared needs of food, shelter, protection, and education, among others. The Living Systems model shows that human social groups are composed of nineteen subsystems that form to fulfill the needs of the human social group. Each social group subsystem is also interdependent on other subsystems for material outputs and information processing. No matter what level of community one looks to in the past, the share of information has been a pivotal fact of human civilization and the rise of community.

Community involves mutually benefiting relationships among a group of people and a sense of belonging and enjoyment from the physical and informational boundaries shared. The HuNI model suggests that as people increasingly build community through virtual worlds of computer networks, the planning profession needs to insure that attention is given to maintaining community and sense of place in physical communities.

The beginning sections of this thesis made light of the fact that technology and perhaps new ways of thinking were "very seldom developed locally." In other words, societies evolved from borrowed technology, and more importantly today, the Internet and its inherent ability to transfer information increasingly at the speed of thought will have an impact on all social groups.

The reach the Internet can have into all information-dependant social groups is very deep. When information processing within the group is mediated through the network, 47.4 percent of human interdependency in the group is no longer needed. Such reduced physical interaction will have an impact on human social systems, which will oblige planners to increasingly consider the relationship that communications technology has with their individual communities.

Thus far, the thesis has observed many of the most important stakeholders in the Network Society, and this final chapter will serve as a practical discussion for community planners. A step back, of sorts, to broadly see how groups of people's needs can be met, and how our neighborhoods, workplaces, and other social linkages can be efficient in getting task-oriented individuals from place to place in harmony with the needs of our neighbors and nature.

To help identify such trends and apply worthwhile information to local situations, several decision-support tools are available to better prepare planners for making assessments

that are in line with the needs of the community. The following section will give two examples of practical decision support tools that organizations may use to focus attention on perhaps "just off the radar" drivers of change.

5.2. Identifying Drivers of Change

A critical element of planning any policy or project that includes multiple issues, the planner must find the best tools for identifying and prioritizing drivers of change. Several chapters of this thesis were devoted to the discussion of driving forces and key changes the Internet will have on American society. However, many of those factors do not apply to smaller communities, but rather larger metropolitan areas. Conversely, some of these driving forces are consistent with both heavily populated urban areas and smaller towns. The planning process can become very cumbersome and ineffective if superfluous information is included in decision-making.

Many prioritization methods allow the local planner to use the most applicable and relevant trends from a wide array of information sources to create a fuller understanding of more practical uses for decision-making tools in the small community. Peter Schwartz, in *The Art of the Long View*, suggests that some trends are predetermined (such as the aging Baby Boomer generation), as their numbers are known and are consistent with the flow of time. Some issues are critical uncertainties (the number of Internet-based services people are willing to subscribe), which need to be determined at the local level weighing against locally known variables. There are also pivotal elements (such as government

regulation and policy), which may change during the planning implementation process, but lobbying and education efforts may help negate adverse effects.[134]

Many tools are available to the planner for aid realizing the importance of predetermined elements, minimizing critical uncertainties, and reacting proactively to pivotal elements. To serve mainly as examples, the decision support tools offered in the next two subsections helped identify and justify the inclusion of such drivers of change into this study. The following decision-making tools were used in the early stages of this thesis to help shape the focus of study and are included in the discussion now simply as an illustration of a technique. More importantly, however, is that these tools are fully adaptable for use in the local community using information suited to local situations.

5.2.1. Prioritization Matrix

The prioritization matrix is a tool intended to help decision makers reduce levels of uncertainty by identifying possible drivers of change for guiding future events and rating them against likely desired outcomes. In this regard, the prioritization matrix acts as a device for improving initial judgment to actual problems and not just assuming and therefore including perceived problems in decision-making.

Qualitative in the ranking and rating, the matrix helps provide a quantitative justification to factors that are not easily justifiable for inclusion in most quantifiable decision-making processes. The prioritization matrix helps decide which driving forces will be significant

in determining outcomes and which factors will not. In total, the matrix provides a context for thinking clearly about the complex array of factors that influence many decisions.

The prioritization matrix is a great tool for identifying important factors in decision-making because the customization levels allow for adaptability for many situations. For instance, one might use the prioritization matrix in their personal life to help decide on the best of a known number of job offers, or the best proposal to award a contract, or perhaps even the best employee to hire. The matrix quantifiably shows how well certain deciding factors, or driving forces, rank against each other with important criteria weighted for relative importance.

To briefly illustrate the matrix concept, Table 5-1 presents a situation where a person has a job offer from three different companies in three different cities. After days of considering which criteria mattered most in the decision to move for a new job, five criteria emerged as the most important factors to consider in relocating. The top five criteria are assigned weights, totaling 100 percent, based on the relative importance of each criterion.

Table 5-1 Prioritization Matrix for Job Offer

	Self-imposed Criteria					Score
	Climate and Environment	Compatibility with Lifestyle	Adequate Salary	Help Reach Career Goals	Ability to Perform Job Successfully	
Criterion Weights	**10**	**15**	**45**	**20**	**10**	**100**
Buffalo, NY	2	2.5	10	9	9	77.75
Miami, FL	9	8	6.5	9	10	78.25
San Francisco, CA	10	9	8	7	4.5	78.00

Rating each criterion on a scale of one to ten, we see above that the job in Buffalo has the best pay and best opportunity for career advancement. The job in Miami has the easiest job and nice weather, but the pay is not very good. While San Francisco has the climate and opportunities best suited to this person's individual lifestyle, the job would be difficult and likely to be very stressful. The individual ratings are factored with the self-imposed criteria to create a score representing the overall rating for the city; the higher the score, the higher the relative desirability in moving to the city.

While the above was a straightforward example, the same process can be applied to decisions that are more complex. As another example, Table 5-2 illustrates a prioritization matrix that was developed in the early stages of thesis research to help identify and rank the relative importance of the drivers of social change to be included in the thesis. Because many technologies are being developed now that will be very influential for future societies, determining the most important factors and the most relevant to be included in the research was an important step.

Table 5-2 Prioritization Matrix for Thesis Discussion Topics

Indicators of Change on the Rural Community						
	Outcomes					
	Involves Traditional Local Planning Ideology	Indirect Impacts to Rural American Community	Direct Impacts to Rural American Community	Probability of Leading to Social Change by Year 2025	Fits Overall Flow of Thesis	Score
Driver of Change	**10**	**20**	**45**	**20**	**5**	**100**
Advertising/Commercialism	3	5	9	7	8	71.50
Business Trends	7	8	9	8	10	84.50
Community Participation	10	9	10	9	10	96.00
DNA Mapping	1	3	2	5	4	28.00
National Economy	6	7	6	6	7	62.50
Education	7	9	8	9	8	83.00
History of Technology	5	4	7	4	9	57.00
Technology Industry Trends	5	8	9	9	8	83.50
Nanotechnology	2	4	2	3	3	26.50
Net Generation	7	9	9	9	10	88.50
Globalization	6	9	4	9	8	64.00
Smart Homes	7	6	5	5	7	55.00
Entertainment/TV/Media	4	9	8	7	8	76.00
Virtual Reality	2	3	2	6	3	30.50
Wireless Technology	7	8	8	8	9	79.50
Workforce Issues	10	9	9	8	10	89.50
Telecommunications Policy	6	6	6	4	7	56.50
Natural Environment	7	8	8	6	6	74.00

The logic behind the outcome weight was determined by each unique situation for which the matrix is being prepared. In the example, the prioritization matrix was used to help rank the drivers of change for inclusion in the thesis. While there are many drivers of change acting on the rural community, the thesis only deals with the changes due to increased technological change in small American communities. Obviously, the most important criteria are those that deal with the outcome of the technological change on the rural community, so the direct and indirect impacts were assigned the largest ranking, 45, and 20 percent, respectively. The total weights for the outcomes must equal one hundred percent.

Each outcome was assigned a percentage weight representative of the level of importance the individual outcome has on the overall priority for inclusion within the thesis. Each driver of change was listed in rows to the left of the table. Then, using best judgment, each driver of change was rated with respect to each criterion at the top of the table with a score of 1 to 10. The higher the score, the more likely that driver of change will influence the outcome criteria.

Because this is a Planning thesis, minor considerations were given to whether the driver of change would fall within the scope of traditional Planning ideology. This factor was used mainly to assist with maintaining levels of relevancy within the scope of study. The final factors included whether the driver of change would lead to social change by the year 2025, and if so, the decision matrix would determine the value of including such topic in the research. In addition, a small consideration was assigned for weighing a

driver of change that would flow within the context of the thesis. Granted, any driver of social change could be considered for inclusion, but the flow of the thesis needs a certain level of consideration.

The drivers of change that ranked with the highest score were the subjects determined that more research was needed to adequately address the changes to the rural community. As seen in the table, community participation, workforce issues, the net generation, and technology were the highest scored drivers of change, and thus received the most research attention and was mentioned most in the thesis.

Methods of ranking and prioritization are important tools for the planner to use in almost any setting. Understanding the roles that different driving forces play on other driving forces is a critical task in planning for change. One can use a ranking method to see if the overall impacts of a driving force will be important in the overall scope of the project, or the planner can use more qualitative methods of discovering drivers of change, as with the scenario process in the following section.

5.2.2. Scenarios

Whether the decision maker is a professional planner or simply an individual preparing for a better future, items that often shape decisions are not often just the tangible items, but rather the intangibles. Intangibles include such things as hopes and fears, beliefs and dreams, and perceptions of reality. Only stories that put number to words can help to

relate potential outcomes. Such analysis helps to relay the quantitative analysis in a more qualitative form of presentation.

The scenario process is another tool intended to help decision makers identify possible drivers of change and make proactive decisions. The scenario process helps guide future decision-making around events likely to occur in the future and relate those events in a context of general overall trends. Scenarios are stories about the way the community, business, or any application might turn out tomorrow, and can help planners recognize and adapt to changing aspects of our present environment.[135] While many decisions are made after considering only one or two variables, the scenario process helps visualize and understand the development of implications that may not be realized without the incorporation of the entire scope of the situation.

While predicting the precise way the Internet is going to affect the small, rural communities is hardly a quantifiable topic of research. For instance, there is no way that one can estimate, with numbers, the impact that the Internet will have on small communities. While numbers can be used to represent people using the Internet or the dollar amount saved through the Internet, numbers cannot adequately express the change to culture or even the loss of community caused by the Internet. Through the scenario process, one is able to "put the numbers to words," so to speak.

While concentration on one individual aspect of the Internet society would be subject to rapid change, with the meshing of each aspect – each subsystem of society – one is able

to construct a scenario of plausible outcomes based on the data and plausible futures of how each subsystem will develop with respect to the given boundary system.

The following sections present very brief examples of what is usually entailed in a scenario. Quite often, more than one scenario is developed in regard to at-large variables that influence a range of possible outcomes ranging through optimistic, pessimistic, and status quo outlooks on the future. With these separate viewpoints, or paradigms, the mindset of the planner can temporarily set aside the eternal optimists within themselves and try to look at varying paths and trappings in the coming period. Equally important, the pessimistic thoughts need a way to look for unexpected breakthroughs and triumphs that might occur. The status quo mentality needs to recognize and prepare for change when it does occur, and not just assume its insignificance.[136] Most importantly, however, is that the scenario process allows for each outlook in society to realize emergent innovation and help shines the light on benefits of application.

Scenarios are often constructed around general themes of likely outcomes to help illustrate plausible futures. With such plausible scenarios, the organization can plan to avoid, capitalize, or otherwise prepare for such anticipated change. Brief examples of scenarios are in the following three sections. While complete scenarios would go much more in depth, these examples provide a quick look at the intent of the different themes of scenarios. Each of these short scenarios provides a snapshot of future life with respect to the level of technological diffusion in the society, and through them decision makers can get a sense of the type of community that will develop due to such technology.

5.2.2.1. Less Network Interaction

Businesses are not entirely secure with sharing mission-critical information with partners and outsourced businesses. Business webs do not fully develop through the supply chain and bottleneck at the centers of production and during information distribution points. Policy has slowed the spread of ecommerce in the early periods of growth by taxing Internet commerce and government finds a way to tax the exchange of information. The regulatory environment has slowed the spread of broadband connectivity into rural and suburban areas. Competition is fierce in the delivery of entertainment content as the same elite media corporations control the same information and media networks. Work remains physically dependant and social interaction wanes, as people have not gotten the time to be in so many places at once. If only communications technologies allowed for greater efficiencies in peoples' lives, time could be better managed. Social capital falls as consumerism pushes the demand for people to work longer hours paying for goods and services they do not need, while spending less time in the community. People begin to feel captive due to technology rather than liberated because few monopolies control the bulk of the content and services.

5.2.2.2. Business As Usual

Manufacturers rely on the network for daily production estimates and orders, and businesses continue to procure products electronically. The tracking of customer behavior continues to drive the production of goods and deployment of services. Logistics

organizations are the largest employers in the service industry and consumer increasingly purchase goods over the network for personal delivery. Retail stores are nothing more than product showcases where people go to see product demonstrations with very little inventory stocked locally. In store, orders are taken over the network and delivered to the home within hours. The regulatory environment continues to favor corporations and their large payrolls and social contributions and watches over the distribution of technology to consumers. Market forces keep technology close to the vest as revenue streams are squeezed for every once of profitability before corporations release new technology to the public. Social capital continues the slow decline as people spend more time socializing with fellow workers and people over the network rather than with local community members. As people lose touch with the community, new community members from other areas interact and act as homogenizing agents to the local culture. With organizations and communities in other parts of the world, donations and instant information keep people more informed about other places through the network than their own community.

5.2.2.3. Hyper Network Use

All people and all their possessions are connected with each other through the network. Smart homes create smart neighborhoods in the "Technoburbs" where society spends countless hours on interactive television, video games, and virtual reality that begins to eliminate the real human experience of life on earth. Companies sell products directly to individuals as intelligent network agents scour the network for the best value on needed

goods and services. Communication is constant and everywhere. Telecommuters hardly leave their homes as the network can provide all the services needed to earn a living. Spending on home improvements increase as people value home life and consider time spent at home as a place of solitude. Tourism enters a renaissance period, as people are able to travel and continue work duties at the same time. Political participation increases in localities as people can now virtually attend public hearings and can vote real-time for themselves instead of the way elected commissioners would represent voters through districts. Informed and connected communities become stronger as increased communications makes for stronger social ties.

5.3. Practical Implications for Planners of Small Communities

With this chapter, we have seen how decision-support tools can be used in the local community to determine drivers of change and apply the drivers in relation with other drivers of change through the scenario process. The first three chapters of the thesis discussed the trends and current drivers of change in many critical areas. In the previous chapter, the HuNI model illustrated the effects that communications and information processing technology can have on social groups of varying sizes and provided a framework for modeling future change. This final section will offer insight into trends likely to occur during the maturation of the Internet and through the diffusion of the communications technologies it represents.

Building on many of the prioritized topics included in earlier chapters, and taking into consideration the HuNI model for social interaction, this section will offer insights for plausible change that could offer driving forces for the three basic scenarios (less, same, and increased network diffusion) provided in the previous section.

This section will present several of the various scenario building blocks, which are presented as key implications for planners to regard in their local communities. Each of the following five subsections will suggest topics that will affect specific localities differently; therefore, the local planner is encouraged to implement decision support tools, such as the prioritization matrix and the scenario process, to develop an individualized knowledge base for prioritizing planning efforts at the local level. This section will end the thesis by offering suggestions in the spirit of the scenario process for local planners on ways to preserve local culture and encourage civic participation in light of various levels of technological change.

5.3.1. Local Workforce Development

With the rise of service industries, self-employment, and flexible work schedules, time for second jobs will not be very difficult to maintain. In fact, some contractors and Internet hobbyists are currently able to essentially work two jobs at one time. The Internet offers high information return in exchange for little time invested. While working at a job that requires the process of matter-energy – physical presence – the information is working in the network. One begs to ask how many "junk dealers" on

eBay.com actually wait behind their computers for orders to come in. They simply check email once a day and spend a few minutes preparing any packages for delivery. The network allows the sale of the product of their own hobbies, or retail products, while they work their primary job or while they produce or procure the items to offer for sell.

Employers that succeed will be those who focus their physical efforts to the point where the information is given physical characteristics – the point in the HuNI model where information processing activates matter-energy processing. No longer is the production mantra the push system of build the widget, and then try to sell the widget. The Information Age changes the manufacturing system to the pull system of sell the widget, and then build the widget. Prepare local economic development and workforce development for changes in traditional roles.

As small businesses grow, encourage small, locally-owned service businesses to operate in downtown areas. The late 1990s have been characterized by a concerted effort by cities and towns of all sizes across America to encourage downtown redevelopment. For a truly active downtown community, people must live and work in downtown areas. Silicon Valley is not the center of the Internet anymore, so the action, the innovation, and the people driving the development is moving to cities and towns all across the nation.

Small communities will be faced with some tough growth decisions to make. Learning to cope with dying remnants of past eras is difficult for rural areas. The whole identity of place is tied in the heritage of what once was the lifeblood of a particular area. Living off

the resources of the land is something that small, but once booming towns, across America capitalized on. One such small community that has transformed a dying local economy to take advantage of new economy benefits is Salmon, Idaho, which is about a two-hour drive from the larger cities of Missoula, Montana, and Idaho Falls, Idaho. While the community holds dear the once supportive industries of logging and mining, the fact remains that such jobs are gone due to changing markets and environmental regulations. However, 3,100 people remain in the town with no real industry to support more than a handful of jobs. Therefore, Salmon has tapped the new economy by successfully creating a technology-based customer call center. The center is starting small but could grow to 100 jobs over time. While 100 jobs averaging $10 an hour would go unnoticed in larger cities, that number of jobs at that pay means a lot to a town like Salmon.[137]

As small communities develop a large number of people who operate small businesses from home, investigate the possibilities of channeling such overall growth to that of a smart community. A hyper-networked community could offer services to local private and residential offices to begin "telework centers," which will be connected to smart homes and retail businesses so that home office workers can gather in the business-like environment, perhaps to socialize and exchange contact information. Such services offered could be advanced printing capabilities, courier service, dry cleaning, and other offerings to teleworkers, and even cater to teleworkers on vacation in attempt to lure social outputs into the community. Again, focus business and community building activities on the point where information takes on physical characteristics. Trends suggest

that social organizations are becoming less social and more professional- and career-oriented, so use that as an opportunity to build community in catering to the small business owner.

Even with future scenarios of reduced network diffusion, labor is cheaper in other parts of the world; so labor-intensive organizations will continue to move production to parts of the world through componentization of production and product assembly. In America, where the standard of living is relatively higher, even status quo scenarios will see new employment, products, and services created by the knowledge sector, which will be made up of entrepreneurs, scientists, technicians, computer programmers, professionals, educators, and consultants. These people will hire and will become the new wave of workers in the coming generation. Such people will serve firms that outsource their knowledge generating capacities and their matter-energy processing abilities. No matter the scenario projected, producer services, distributive services, personal services, and social services will lead the way in future workforce development.

5.3.2. Local Government

Planners should be advocates of technology in local government and reassure key decision-makers in the organization that technology is good for the community. To get non-participating citizens more involved in the community, work to bring the local government, all local school systems, and non-profit organizations together through the network. Students will take an active part in the community, learning valuable life skills

while developing a sense of place for their community. Non-profit organizations will get the exposure needed to prosper, and while government is always in need of public participation, the more people represented will make for a better-unified voice.

Bringing citizens together through the network will increase the awareness necessary to protect local culture and community bonds. Use local politics as a rallying point for social organizations and schools for the benefit of all people of the community. The network is global in scope, but localities that learn to benefit from the community-building opportunities will excel in the network age.

In the scenario process, policy is seen as a pivotal element. Nearly impossible to predict years ahead of time, policy can be created relatively quickly and can have far reaching impacts into any strategic plan. For a hyper-networked scenario to likely occur, regulatory policy will have to be kept to a minimum to encourage the free market development of beneficial technology.

Currently there is both over-regulation and insufficient regulation in the world of the Internet, both of which extremes can hurt local business and consumers. Some laws in the future will facilitate network commerce in perhaps every conceivable Internet activity; other laws will rein in the Internet's excesses and infringements. In the early period of network policy, it is important that the small community capitalize on the far reaches of Internet policy issues, such as local taxation of Internet commerce. As one magazine

editor wrote, "Like them or not, laws and regulations have not been consigned only to the historical past, so pretending they have been will amount to ignoring reality."[138]

To insure that a particular society becomes a beneficiary of globalization instead of a victim of that internationalization, government should encourage non-profit organizations to use technology to gain competitive advantage for their locality. The civilization of earth has been characterized as survival of the fittest. Technology is yet another evolved tool to insure survival of fiscal and cultural goals for the community. In the business world, globally competing corporations use communications and information technology for advantages in business. Private and public organizations around the world can now use that same interactive consumer technology for advantages in their rural economy to ensure continued existence.

Successful organizations will be those able to generate knowledge and process information efficiently. Establish a Knowledge Management program and if necessary, outsource the customized development of Enterprise Resource Planning (ERP) software. Such applications will help identify inefficiencies in the organization and will become a tool for streamlining organizations operations. While operating government like a business, community citizens become the customers, and a Customer Relationship Management (CRM) program will enable community members to interact with each other to derive valuable information from their actions and messages. Civic leaders will then be able to extract information from the exchange to make continuous improvements in service, and will work build community in the process.

5.3.3. Land Use

One of history's great lessons is that new forms of infrastructure can dramatically reshape a city's life. In the 19th century, the Erie Canal was critical in thrusting New York City to the forefront of the young Republic's cities, while the railroads later helped Chicago overtake St. Louis as the commercial hub of the Midwest. In the first half of the 20th century, rail lines, improvements in water and wastewater distribution systems, the emergence of streetcars and the development of electrical and telephone systems helped fuel the growth of America's great cities. In addition, the latter half of the 20th century brought the construction of highways that helped fuel a great suburban migration.

Viewed in this light, it seems obvious that the emergence of the Internet and other forms of telecommunications is likely to result in significant changes in land-use patterns. If the opportunity exists for the community to implement better network infrastructures, buy all means fund such projects. The network is the real estate, the water canals, the railways, and the highways of yesterday. Just as early movers in transportation capitalized on their location beside a transportation hub, the network is the same growth system of the present day for throughput of information. The Internet garnered the early title of the "Information Superhighway," and with respect to community development, that could not ring more true today. With a powerful network presence, every community has the opportunity to have a superhighway running through Main Street, so to speak. Without

capitalizing on the power of the network in the early "land rush" stages, finding a niche in the future may become difficult task.

The digital revolution's most valuable commodity – talented workers – can choose where to live and work. Thus, quality-of-life has replaced such traditional factors as natural resources, cheap labor, and low taxes in determining which regions will thrive and which will flounder. Hyper-network scenarios will have people engaging in trade from every imaginable place, especially the home. How much of an increase in business traffic, in the form of delivery trucks and other services, are residential areas prepared to cope with? Local zoning commissions will have to come to terms with residential areas being the site of network-based businesses.

5.3.4. Tourism and Growth Communities

Unique rural cultures that survive the global effects of societal homogenization will be those that learn to use technology to their unique advantage. As the HuNI model shows, information processing subsystems will be an important function of society in the coming years. Local tourism efforts may be a vehicle for insuring local cultural identity is preserved for rural communities. Rural tourism activities do bring economic dollars into the county tax coffers, but the other side effects of the local tourism effort is to accentuate the positives of the community and preserve the unique heritage and sense of place.

In even the less networked scenario, information gathered online will be what people know and understand about the local community and culture. As the net generation matures, they will want to visit the place they learn about online; therefore, it is important for the endurance of rural economies that the proper development of the service sector is encouraged. While one can envision several tourist boomtowns across rural America, those near national parks and other natural areas are prime locations for early retirees and telecommuters. In operating government as a business, the tourism functions are the marketing equivalent for the corporation.

However, in marketing such local cultures and their natural resources, communities near treasured natural areas are in a catch-22 with the traveling and relocating public. As people move from the cities for a less hectic pace of life, these natural areas will be prime destinations for relocating. A remote worker can have his summer home-office in Jackson Hole, Wyoming, to enjoy views of glacier-topped Grand Tetons, hikes through its beautiful Yellowstone meadows, and fly-fishing along the slow-moving Snake River. Another worker can move to the Everglades in Florida during the winter, adding to the burgeoning development in ecosystem-dependant south Florida. The same can be said for the delicate ecosystems of the desert southwest, the natural treasures along the coasts, and the pollution-ridden Appalachian Mountains.

Plan for intelligent growth with respect to protecting the natural environment. According to the 2000 U.S. Census, the populations of the Southwestern and Rocky Mountain states

are the fastest growing sections of the country. Nevada's population exploded in the 1990s, growing 66.3 percent, most to Las Vegas, one of the fastest growing metropolitan areas in the nation. Colorado's population increased 30.6 percent and Utah's by 29.6 percent. As increasing numbers of Americans flock to public lands to escape one another, the wilds and undeveloped are being trampled.[139]

Regional environmental planners need to collaborate with local community leaders in planning the appropriate promotion and support efforts. Most importantly, the planner can make certain that local leaders are aware of the impacts that increased visitation will mean for the local economy and the preserved natural areas, and perhaps what would happen to the local economy without a healthy natural ecosystem nearby.

5.3.5. Technological Diffusion

In the Information Age, production levels are measured by the knowledge capacities of the organization. Knowledge of consumer habits, knowledge of industry trends, knowledge of the market, knowledge of technology and other information are essential for the success of any size organization and community. Most rural communities do not have excess capital, the best computers, or the most experienced staff. Work smarter, not harder, so make the best use of existing intellectual, human, and structural resources to improve the performance of the department.

While cultural identity and sense of place are two very important issues in community planning, the Planner must keep in mind the changing attitudes of the changing population, new technologies on the horizon, new efficiencies created both in the marketplace, and changing consumer behavior. Because of changing lifestyles, what current community members consider leisure activities may be different from the leisure time of twenty or even ten years ago, and conversely, ten to twenty years from now. Trends suggest that civic engagement will call for successful planners to support many of the once neighbor-type activities for members of the community. Therefore, local planning efforts should support initiatives to encourage active participation for the community.

If the Planning staff sees an area in the community that can benefit from technology, go with the idea. If developments cannot be facilitated in-house, application providers exist in the market that can adapt their technologies to fit any given situation. Small communities are often like the early small businesses of the "dot com" era. Such small organizations are nimble and can fly under the radar, stretching resources as far as possible, taking the larger organization by surprise with their inventiveness and willingness to take smart steps with the efficiencies offered through technology.

Because information can now be obtained through the network, the right knowledge base and the proper planning focus will allow resourceful organizations with an understanding of the power of the network to create new industries and challenge existing industries. In even the status quo scenario, the small community has a distinct advantage to capitalize

on the efficiencies offered through the network. A scenario with less network interaction will be create less players in the network and the community will miss out on the benefits the network offers.

In a hyper-networked community, one can imagine community leaders working with wireless network applications to encourage location-based services in commercial areas of the community. Through personal network devices, such applications could alert patrons of downtown businesses of special offerings through the network, remind people of the importance of the next city council meeting, or inform community members of civic engagements in the community. A "free unlimited-bandwidth zone" in a downtown area could certainly diffuse technology in the town, as well as create community among civic-minded individuals looking to distribute information to other individuals living in or passing through the local area through a wireless network.

CONCLUSION

At the beginning of this new century, small American communities are peering over the edge of a gigantic wave into a sea of converging media, interactive entertainment, ubiquitous connectivity, and imminent internationalism. Once the wave breaks, the world and all its connected individuals will crash upon the shore with new paradigms of thought, new cultures to consider, unique opportunities to investigate, and valuable information to share. Ultimately, the wave will retreat and in its wake will mix the multitude of innovation and knowledge to spur on a new era of human creativity, perhaps an age of progress and productivity never before known to civilization.

This rising tide of ubiquitous communication delivery and information-processing is beginning to change humans and their social interaction today. The Net Generation is growing up in an age where data and processed information are available for the taking. Marketers and entertainers have new channels for building global brands by selling products interactively and persuasively. Corporations and businesses of every size are sharing supply chains and distribution networks discovering new streams of revenue and improving return on investment. People will live where the geography and climate suits them best – where they want to live and not necessarily where they need to live.

The level of influence the network will have in the physical design of American towns and cities is to be debated, but no question about it, the network will have a consequence on social participation in communities of every size. Services will follow such people, a

new house, a new road, a new grocery store, and soon new neighborhoods, extending the utility infrastructure along new patterns of growth. Small towns will develop differently when geography serves no limits to how far a person must live from work, from school, or from family.

Community is a mechanism for personal, social, and economic fulfillment, providing its citizens with the means for goal-attainment for the individual and for the social subsystems the community supports. People need community and appreciation of culture for healthy development of sense of place and belonging. We have seen that individuals, families, organizations, and institutions actually need community in order to sustain the development of the social group. The community is the social meta-system in which other subsystems function. The stronger the links in these social networks, the more effectively members collectively support the community-building processes.

Network devices are continually being introduced into American homes, just as more mobile network devices are carried around with individuals for both work and leisure. The nature of networking and the network economy proves beneficial to connect such devices. Through the connection of these network devices, people connect with people, machines connect with machines, and people connect with machines. Such all-encompassing connectivity calls for the merging of the network model with the model for social groups. Through the network, people will be better connected, and such connectivity will be beneficial for the community. In a matter of years, humans and social

groups will notice the absence of the network as much as we notice the network's presence today.

As seen with the HuNI model, the network is changing the information-processing social interactions required of the human social system. Without social interaction, communities rich in social capital will begin to weaken. Precise prediction of how the network will change a specific rural area or small community is nearly impossible. However, plausible outcomes based on the interactions of all the various local subsystems will help decision-makers strategize the best possible plan of action based on the effects the network will have on their own community.

The HuNI model allows that new service industries could perhaps reduce the role for humans in the information-processing subsystems of social groups. Substituting human participation with information-processing subsystems will lead to increased efficiency for corporations, cheaper labor for producers, and additional benefits for other matter-energy processing subsystems. For communities, the use of the network for information gathering and processing could lead to less social engagement in civic organizations.

In return for that human displacement, matter-energy processing subsystems of social groups will gain importance in society. The point where information from the network takes on physical characteristics is where humans will play increased roles and have increasing value in the community. Both informational and physical service industries will rise to perform niche roles for consumers and social groups. Producer services,

distribution services, personal services, and social services will see an increase in participants and employment. Social groups, businesses, and families could be willing to outsource services and contract labor rather than devote time or other group resources to perform needed duties. Planners must know that with processed information physically coming to the hands of consumers, the market soon follows. Small communities and underdeveloped areas that are currently unaccustomed to such a hurried pace of development could see a rising population and increasing need for services.

Even without the effects of the Internet, trends show that for the better part of twenty years social participation has been decreasing in almost every type of civic organization. Therefore, it is of most importance for small communities in America to have a strong network infrastructure to reinforce community bonds through the network. While community planners can never substantially retain small town charm and neighborhood intimacy of rural areas, it is possible to use information processing and communications technologies to support civic recruitment and social participation to increase social capital and add to the value of community and culture for future generations.

The network provides the greatest benefit when used as a strategic resource; to manage these anticipated changes for the best use of the community. The range of social, economic, and political implications unique to each community should encourage community participation around the network, and not simply through the network. The challenge for community leaders is to develop an overall positive awareness of technological innovation among their constituents and a willingness to use networks as a

means of improving the community's standard of living and physical connectedness. The public network can foster localized social interaction to help *sustain* culture in the small community, but only through physical interaction will communities continue to *generate* social capital for the future of the community. The planner's role in the rural community will be to ground network users to their physical community while giving them tools to compete successfully with the network's virtual communities.

By no means is the small community on the verge of disappearance. In fact, because so many goods as services are available to the small community, the small community may be on the threshold of a renaissance. Some people consider many characteristics of urban and suburban areas problematic for their individual desires. Issues such as congestion, pollution, and lack of individual identity may not be of immediate concern for smaller communities. More importantly, however, the small community will no longer retain the technology- and information-deprived characteristics of the rural American stereotype. The pervasiveness of the network permeates physical boundaries. The speed of the network is instant.

The challenge for the community planner is to develop a positive awareness of technology in order to diffuse innovation among the members of the community as a means to improve their lifestyle, protect the local culture, and increase the social capital of the community. To increase the value of culture and community, the Planner needs to use the power of the network to make certain that members of the community spend less time sitting passively alone in front of glowing screens and more time in active physical

connection with fellow citizens. Let us foster new forms of electronic entertainment and communication that reinforce community engagement rather than forestalling social interaction. By building social interaction through the network, community leaders will discover intriguing and stimulating ways to encourage civic participation.

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After he graduated from college, Mr. Ogle worked in the Marketing Communications department of the Tennessee Valley Authority in Knoxville, Tennessee. After time spent in the corporate environment of TVA, he returned home to promote tourism-related business development as Director of Tourism for Cocke County, Tennessee. Fascinated by the many facets of planning in the rural community, he enrolled in the University of Tennessee's Graduate School of Urban and Regional Planning where he graduated with the of Master of Science degree in Planning in 2001.