Lindenwood University

Digital Commons@Lindenwood University

1996

The Development of the Information Superhighway and Its Impact Internally and Externally to the Business Community

Kay A. Hammond

THE DEVELOPMENT OF THE INFORMATION SUPERHIGHWAY AND ITS IMPACT INTERNALLY AND EXTERNALLY TO THE BUSINESS COMMUNITY

Kay A. Hammond, B.S.

An Abstract Presented to the Faculty of the Graduate School
of Lindenwood College in Partial Fulfillment of the
Requirements for the Degree of Master of Business
Administration

1996

ABSTRACT

This thesis will focus on the development of the information superhighway and its impact on the nation.

Ten or twelve years ago, a minor revolution occurred when personal computers became common. Visionaries talked about computers as information appliances. Users could use the home or the office computer to connect to the national news services, get stock reports, do library searches, even read professional journals or literary classics, but, at the time, these were far-reaching ideas.

With the Internet, networking has come to age. The information resources that visionaries talked about in the early 80's are not just research topics that a few advanced thinkers can play with in a lab - they are real-life realities that users can tap into from their homes. Once they are connected to the Internet, they have instant access to an almost indescribable width of information and most of it is available for free.

Through electronic mail and bulletin boards users can use a different kind of resource: a worldwide supply of knowledgeable people, some of whom are certain to share the users' interests, no matter how obscure.

Many people view Internet as the Interstate Highway System for information. Internet provides a way of meeting others and sharing information. The science teacher can access a NASA-funded computer that provides information - past, present, and future - about space science and the space programs. Internet is a catalog of information sources which has something for everyone.

This research supports the hyposthesis statement that growing businesses need to invest in the Information Superhighway to remain competitive. The Internet allows businesses to access leading edge information in technology and allows data to flow within, as well as in and out of companies at a rapid pace. Without network communications, like E-Mail, companies would lack speedy turn-around time on

requests.   In today's society, immediate response is critical to prevail competitively in the marketplace. The Information Superhighway is the ultimate way to share information.

THE DEVELOPMENT OF THE INFORMATION SUPERHIGHWAY AND ITS
IMPACT INTERNALLY AND EXTERNALLY TO THE BUSINESS
COMMUNITY

Kay A. Hammond, B.S.

A Culminating Project Presented to the Faculty of the
Graduate School of Lindenwood College in Partial
Fulfillment of the Requirements for the Degree of
Master of Business Administration

1996

COMMITTEE IN CHARGE OF CANDIDACY:

Associate Professor Daniel W. Kemper,
        Chairperson and Advisor

Adjunct Assistant Professor Patrick Akers

Adjunct Assistant Professor Laura DeRigne

i

TABLE OF CONTENTS

List of Tables

v

List of Figures

Chapter 1

INTRODUCTION

The term "Information Superhighway" actually came first from a speech given by Vice President Albert Gore on December 21, 1993, when he addressed the National Press Club in Washington, D.C. That speech and that phrase in particular, was the siren's song to the mass media. They took the idea and the terminology to heart and gave out news that the Vice- President had given birth to the watchword for the future of communications. Suddenly, because of one speech, nearly all those who walked the earth became aware of something that had in fact quietly existed for a longer time. That "something" was the Internet (Canter 4).

"Information Superhighway" is the term used when a group of people or organizations talk about providing a mechanism which allows businesses to exchange information through the establishment of networks of all kinds via the computer. Building a network such as the informationsuperhighway is expected to cost over $400 billion (Piller 96). The information superhighway

1

will link the product with the consumer, and companies will spend more on computing andcommunications gear-- the capital goods of the new era--than on industrial, mining, farm, and construction machines. Info tech is now as vital, and often as intangible, as the air we breathe. In an automobile, the $675 worth of steel that surrounds the consumer is noticeable, but not the $782 worth of microelectronics. The Industrial Age gave way to The Information Age and it drives the economy (Stewart 75).

A group of people can make up a network, whether their communications are formal or informal, regular or sporadic. A computer network is not much different. It consists of computers and other computational devices that exchange information over physical links using conventions recognizable by all nodes. The computer communicates with the printer via cabling, sending it bits of recognizable information.

The advantages of networking is a matter of economy. A group of people (or organizations) perceive that by establishing a network, their individual goals

will be more economically achieved or achieved more effectively. Networks offer:

- o sharing of expensive computation resources,
- o sharing of peripheral devices such as printers or disk drives,
- o sharing of information resources, and
- o channeling of information efficiently.

What is today referred to as 'cyberspace' has, for the most part, developed and grown from its modest beginnings in the early 1970s into a globe-wide 'matrix' with relatively little directed input or interference from businesses or governments. However, with government, commercial and public attention turning towards the global Internet and the proposed US national information infrastructure, this is about to change. As this happens, it become increasingly obvious that cyberspace is too important to leave to specialists, or special interests. Therefore, as individuals become increasingly more aware of the intellectual, social, commercial and political leverage possible through participation in cyberspace, its potential importance is no longer just a function of

convergent technologies but also that of its intelligent and deliberate use by an informed population (Ogden 713).

As early at 1969, the Defense Advanced Research Projects Agency began investigating the feasibility of connecting heterogeneous computers over a wide geographic area. To manage communications between diverse computer platforms with different operating systems and to execute various routing operations between a quickly growing number of nodes (a central computer that is part of an internet-connected network; sometimes used interchangeably with site or host), a common command language, mutually usable in different environments, was developed in 1973-74. The Transmission Control Protocols and Internet Protocols (jointly called TCP/IP) are important because they have, to this day, remained the standard Internet protocols and support such common functions as file transfer (File Transfer Protocols), electronic mail (Small Mail Transfer Protocols), and remote login (Telnet). In the early 1980's two very important events took place: DoD (Department of Defense) adopted

TCP/IP as a standard network protocol, and it funded the Berkeley UNIX development group to incorporate TCP/IP as part of the UNIX (versatile multi user operating system) environment. This initial partnership between TCP/IP and UNIX meant UNIX would always have an edge over other operating systems in being better able to accommodate Internet-based functions and resources (21).

Two characteristics of the Internet should stand out. First, the Internet is not a single network. It comprises many networks of various sizes with many nodes dispersed geographically. Second, the Internet is massive in terms of the number of networks, computers, and people it connects. There are today more than 15,000 large wide-area networks officially linked to the Internet. Of the total, more than 6,000 are foreign networks. The internet is estimated to connect nearly a million computers worldwide, and the volume of data traffic, according to a March 1993 statistic, can reach as high as 6 trillion bits of information per month. According to John Quarterman, an Austin-based Internet consultant, the size of the

Internet has been doubling every year since 1988. Today, the total number of Internet users is approximately eight million, and of these, approximately a million use the Internet every day (23).

There is no such thing as a typical connection to the Internet. Every user and every microcomputer that can reach Internet resources does so over different channels and through varying types of services. However, the general process for all users is similar (24).

Most users connect to the Internet through their work or campus network. More recently, additional independent service providers have offered access to individual home computers through dial-up facilities. Internet is a collection of networks. Thus the campus network, the mid-level regional network, and the backbone all together are part of the Internet.

Many typical connections from the home to the Internet make use of university networks. The University of Texas at Austin's campuswide network is a good example of a wide-area network (WAN) and a

connection to the Internet. It is composed of several
interconnected local area networks (LANs) through-out
the campus. A campuswide Ethernet system (a ten magabit
per second local area network enabling multiple
terminals to communicate together within an office
complex) joins many of these smaller local networks,
which include buildingwide or departmental groups of
computer systems. These interconnected systems are
known collectively at UT-Austin as UTnet (25).

The most important components of UTnet for
Internet access are the mainframes, minicomputers, and
workstations of the campus computation center. These
systems have a dedicated Internet connection. Through
a personal or public-use account on these systems, an
individual gains access to Internet resources. The
primary computers of UTnet are named EMX, UTXVM,
UTXVMS, BONGO, and CCWF (itself a series of
workstations). These systems all offer access to basic
Internet applications such as FTP and Telnet. Many
users choose a certain machine for Internet access
because of its particular operating system and user
interface. For instance, many people choose to use a

Figure 1

Model Internet Connection - From university network to a home computer
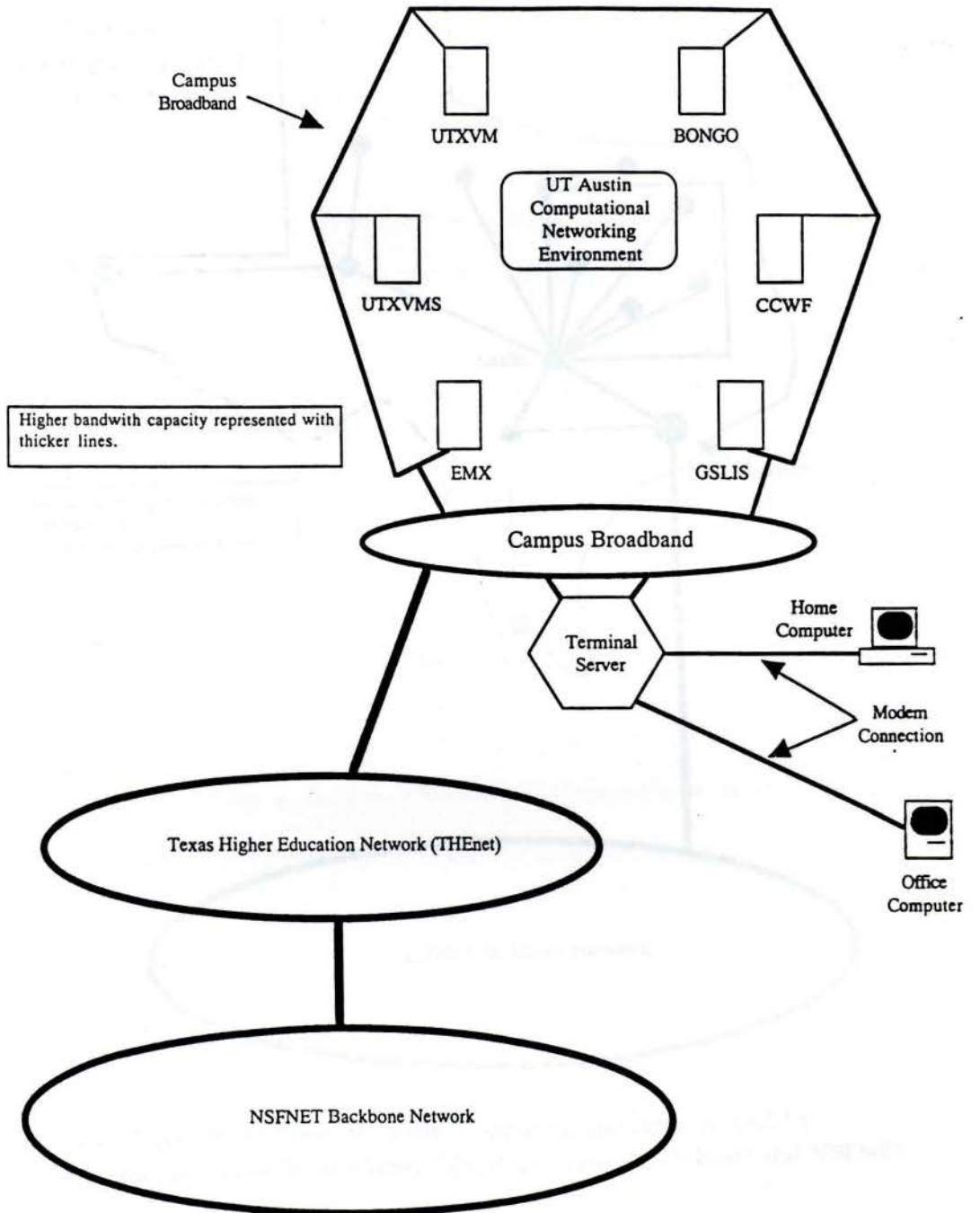
Source: <u>Easy Internet Handbook</u> by Javed Mostafa, Thomas Newell, Richard Trenthem

Figure 2

Model Internet Connection - From university to university
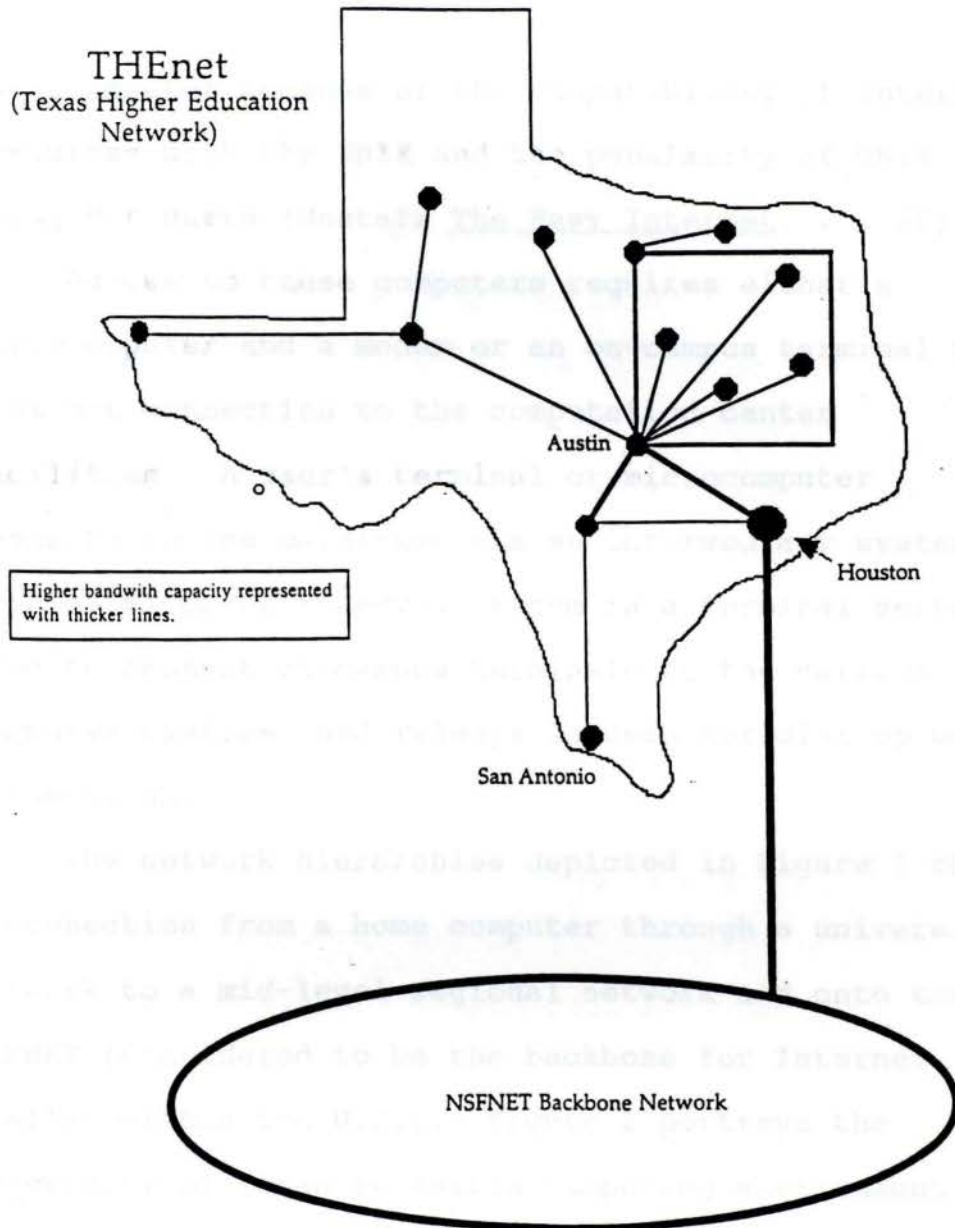
The University of Texas at Austin Computing Environment and Its
Connection to the Texas Higher Education Network (THEnet) and NSFNET.

Source: Easy Internet Handbook by Javed Mostafa, Thomas Newell, Richard Trenthem

UNIX computer because of the compatibility of Internet resources with the UNIX and the popularity of UNIX among Net users (Mostafa <u>The Easy Internet</u>. . . 25).

Access to these computers requires either a microcomputer and a modem or an on-campus terminal with a direct connection to the computation center facilities. A user's terminal or microcomputer connects to the mainframe via an intermediary system such as Micom or Telesys. Micom is a terminal server used to connect on-campus terminals to the various computer systems, and Telesys is used for dial-up modem connections.

The network hierarchies depicted in Figure 1 chart a connection from a home computer through a university network to a mid-level regional network and onto the NSFNET (considered to be the backbone for Internet traffic within the U.S.). Figure 2 portrays the University of Texas at Austin computing environment and its connection to the Texas Higher Education Network (THEnet, a mid-level regional network) (21).

Proponents argued that a network of this order would give researchers the computational power

necessary to solve complex, high-order mathematical and simulation problems. By distributing the computers and creating means for researchers to communicate with them over this proposed national information highway, the high cost of fast processors is spread among many organizations. The Internet today is used to this end. Many university and business networks are organized along similar lines. By purchasing one powerful system and establishing and controlling access to its tools, the entire organization benefits (4).

Typical office networks connect workstations to share printers and in some cases distribute file storage devices. Such connections allow an office manager to provide the use of an expensive tool to a wider range of users. Shared file storage provides a means for maintaining large files of information that may be beyond the storage capacity of individual workstations.

Computer networks provide means for groups of people to share common information resources. An office work group or a team of research scientists working at separate sites can make use of a network to

share a common set of data. Consider the example of a business that sells widgets through a national distribution network. Distribution sites take customer orders for widgets and input those orders into a common database. Using a shared network, the distribution sites can track the manufacturing sites scheduling information and determine delivery dates. The manufacturing sites can stay abreast of sales data and more efficiently schedule production. Managers can follow sales and distribution processes to make informed marketing decisions.

Computer networks give organizations the ability to apply economy of force to solving problems and achieving goals. The traditional linear and hierarchical organizational model can be modified quickly and temporarily to foster efficient work group relationships geared to solving immediate problems. Networks allow for assigning geographically dispersed people (and even organizations) to the same project using telecommunication rather than collocation. This capability has generated much discussion centered on what as come to be known as "virtual corporation" (5).

Many software tools common in the modern office incorporate features that allow many people to edit and contribute to joint projects. Consider a group presentation that merges images, spreadsheets, and text. One person may edit images, another may perform spreadsheet analysis, and yet another may edit text. Despite the fact that the project contains three distinct groups of data stored in three different locations, the end product appears as a whole. Software tools recognize and assemble all the pieces of the project across the network (5).

Networked communication tools have made the process of seeking fast, interactive consultation or advice an easy and inexpensive alternative to telephone, fax, or mail exchange. Other examples of shared information resources include user communication such as e-mail programs, electronics discussion groups (LISTSERVs), and electronic bulletin boards. E-mail leads the pack of current applications according to *InfoWorld* readers. When asked to rate, on a scale of one to ten, the importance of different applications, close to thirty percent of the respondents gave E-mail

a score of ten (Metcalfe "Readers ponder Iway. . . ."
72). E-mail provides management with day-to-day
information about processes, cuts down on paperwork,
and reduces telephone costs (Foster 54). Networks
provide people access to capabilities such as these,
and their impact on lives is growing daily.

Editor, Bob Metcalfe of Infoworld, predicts that
digital TV set-top boxes will be used as clients and
cable TV head ends will be used as servers and claims
that clients will have the power of today's $2,000
personal computers--for $200 (Metcalfe "Here's How to.
. ." 54).

Even the Library of Congress is planning an
ambitious digitization project aimed at digitally
reproducing a number of works from the library's 104
million-item collection and from the collections of
other public and research libraries. The reproduced
images would then be distributed over computer networks
to millions of students, researchers and others, and
could be expanded to include film and audio clips. The
project is outlined in a memorandum entitled 'Strategic
Directions Towards a Digital Library,' which was made

public on Oct 13, 1994. The plan envisions the Library of Congress taking the lead in coordinating the technologies and policies necessary to establish a vast network of interconnected digital libraries. Sources report that funding for the project is expected to come from appropriations from Congress, as well as through donations from individuals and businesses (Lewis B1).

Newspaper companies busy themselves building their section of the information superhighway. Established in 1989 primarily as a sports statistics provider, the Gannett/USA Today Sports and Information Center in Greensboro, N.C. today repackages content from USA Today and other Gannett papers and makes it available electronically. The service offers full-text news stores, brief items on topics such as business, travel and weather, and a bulletin board allowing users to communicate with each other (Case 12).

Ultimately, the purpose of a network is to empower its users. Information is power, and computer networks deliver it into the hands of its users. As people are the first and most important component of an organization, an organization is only as talented and

capable as its people. Networks are a tool that people can use to improve productivity through rapid information interchange. Computer networks, however, are not without their disadvantages. Common problems with computer networks include:

- o implementation and maintenance costs,
- o security and privacy,
- o accuracy and reliability of data,
- o disparities between individuals and groups with regard to wealth and information access.
- o employees' resistance to change,
- o varied technical standards, and
- o an accelerating pace of technological change. .
  (Mostafa The Easy Internet. . . 5).

The physical components of a network can be expensive to purchase, install, and maintain. Information managers must weigh these costs with the value gained in order to determine if a network is necessary or beneficial to solving the problem at hand. This consideration can often be a question of scale. "We need a network, but not a large one." "We need a way to communicate and share information with an office

overseas." "We just want to share a printer between offices." These are all examples where scale is the most important factor to consider for network implementation (Mostafa The Easy Internet. . . 6).

All networks face security problems. Because all machines on a network are connected (and certain machines may share storage devices), the potential exists for unauthorized access to sensitive or private information. Network tools exist for system administrators to minimize and manage risk, but risk cannot ever be completely eliminated. Certain files that may contain privileged information will have to be reserved for use by select individuals. Part of security revolves around privacy related to electronic means of data and information transfer. Procedures must be in place to ensure network communications reach their intended recipients. Managers must give thought to the protection of the system from computer viruses.

Information obtained from a network is not necessarily accurate or reliable. Information such as that in distributed databases or research data used exclusively within the bounds of a particular group is

only as accurate as that group wants to make it. It is often difficult to gauge the accuracy of data gathered across network ties. The inaccuracies of network information are especially evident in information gathered from electronic forums such as discussion groups or news groups. No institution ensures the reliability of information disseminated through these channels. Thus, users should consider the accuracy of data before making decisions based upon what they have found (6).

In the growing debate about a national information infrastructure (NII), there are those who argue that information and access to it are fundamental rights and that communications networks implemented as part of the NII must accommodate all people. Some researchers have concluded that an information gap exists between the wealthy and the poor, and that the gap is growing. Access to electronic information is obviously limited to those with computers and a means to link with a network. Certainly some organizational networks will remain closed to public access, such as those operated by businesses or military organizations, but there are

still questions about public access to the NII. Much debate is centered on how to ensure that all people will have a means to tap into this information superhighway, but no clear answer has yet emerged as to how this will happen (7).

Network managers often must coordinate the connection of dissimilar hardware and software. Not all users employ the same software, use the same type of computer, or even the same network communications scheme. This causes translation and protocol problems that must be resolved in order for a network to realize its potential. The wide-scale adoption of TCP/IP as the network protocol has encouraged and eased the connection between dissimilar networks and machines and helped to accelerate the growth of the Internet.

The rapid growth of the Internet highlights a phenomenon of the computer industry; the rate of change is accelerating. Machines purchased as few as two years ago can be considered obsolete today. Network communication technologies are changing the nature of how people communicate and share ideas and changes in technology force changes in these relationships.

Network managers must consider and plan for the pace with which change occurs in order to best support the demands and needs of the people whom they support (7).

Summary and Statement of Purpose

As stated the Internet's explosive growth into a global communications and research network has caught the world by surprise. Congress wants to develop and fund the National Information Highway (NIH), or Information Superhighway as it would extend to other parts of the word, to foster economic and scientific growth within the United States. The U.S. Congress is figuring out how to run the Internet on the NIH. Congress hopes the NIH will achieve the same results as the legislation in the 1950s that paved the way for the interconnection of major cities across the United States by a federally funded interstate highway system. The interstate highway system helped strengthen the economy, encouraged growth of transportation industries and the companies they served, and spurred local governments to build secondary roads. Congress also hopes that establishing the NIH will promote industry

investment in the NIH's infrastructure and in new applications and ways of using it. Large communications companies, regional phone companies, long distance companies, cable TV companies, and others will be getting into the picture. Many companies will find nitches providing unique information and services via the Internet and the Information Superhighway.

The purpose of this project is to evaluate the trends and issues surrounding the Internet and to determine the reasons why any growing business needs to invest in the Information Superhighway.

Chapter II

LITERATURE REVIEW

As work becomes increasingly intensive, organizational success depends more and more on giving each individual contributor needed information at the right place, at the right time, and in the right form. The degree to which this requirement can be met depends crucially on the information architecture used, the organization's "nerve system" (Penzias 206).

Computers are visible in almost every aspect of our daily lives. The computer revolution is not about machines but about the movement and management of massive amounts of information (Stair ix). They have a vast and growing use in the workplace, not only in the United States and Canada but throughout the world. The power of the computer to calculate rapidly and perform certain everyday tasks is creating new job markets (Epstein 6).

Ever since the advent of large computers, or "mainframes," many organizations have chosen to fulfill their information needs by keeping all data at a

central location. In such systems, the map of
information flow resembles a wagon wheel with its rim
removed. The terminal at the tip of each spoke sends
and receives from the mainframe computer at the hub.
The mainframe handles all data processing, storage, and
retrieval, as well as whatever communications between
terminals is permitted by the system. No piece of
datum is supposed to get out of reach because there is
no way of creating, modifying, or storing records
anywhere but at the hub (Penzias 207).

Local Networks

Central data managers usually strive for
efficiency by keeping formats uniform, by offering
users only a limited range of options to meet their
special situations. Modifying the system to handle
exceptions is generally expensive; some pieces of
information cannot be accomplished. Imagine a
worldwide insurance company starting to do business in
Saudi Arabia, for example. The central system could
expand the "spouse" category to permit multiple
entries. If the information entered was not in the

right format it would not get stored in the system.
This could cause major problems. Such a drive toward
uniformity usually saddles everyone in the organization
with a single all-encompassing data communications
network whose characteristics are defined by the
central management. As a result, many local common-
interest communities find themselves forced to find
"private" means of meeting their specialized needs, and
proceed to set up networks with their own data format
and connection schemes (207).

For example, the purchasing agent whose desk has
three terminals crowded on it: a vendor-supplied order
-entry machine, a second one that runs the specialized
software the purchasing department uses to do its job,
and the dumb terminal connected back to central files.
This later terminal is needed for information such as
which employee is authorized to sign which kind of
purchase order. The purchasing agent also needs access
to other networks, but the crowded desktop doesn't have
room for more terminals. The result is a proliferating
number of isolated networks, few of which offer

information access to other people in the organization
(208).

Overcoming isolation by attempting to connect
everybody to everyone else is both prohibitively
expensive and unnecessary. A better solution is to
facilitate the creation of local networks that are
themselves networked together. In this scheme,
individual information needs can be met by
participation within common-interest groups tied
together by their own formal or informal networks.
This essentially amounts to ratifying what people
prefer to do anyway. From the users' point of view it
takes membership in several such user-defined networks
to satisfy the multiple needs of any particular
individual (208).

Hospital and insurance companies are, for example,
common-interest groups that need to be linked together.
During a patient's stay, the people processing the
paperwork jot information on various forms, which the
hospital's data-entry clerks type into the hospital's
computer. Later, some other clerk sits down with the
patient's insurance form and copies in data from the

hospital's computer. The insurance company gets the form via computer transfer and the transaction is ninety percent complete with almost no delay. This alleviates the patient from having to pay up front until the insurance company gets the paperwork in the mail, etc.

Technology can ease these modern complexities. It is much simpler to give the insurance company's people access to needed information direct from the doctor's records. This calls for a networked architecture in which the insurance company's front office has enough processing capability to provide the electronic interfaces needed to access the hospital's files (Penzias 210).

Advanced Networks

Computers are usually thought of by most people as tools to do calculations, solve problems, and process or keep records. The Defense Department called the Defense Advanced Research Program Agency (DARPA) wanted a computer network developed to support its efforts. DARPA saw computers differently. They wanted them as a

means for people to communicate with each other. To fill the need required a network. A software system had to be developed that would allow many different brands, sizes, and types of computers to speak to one another. This system was called a protocol. By developing the protocol, Arpanet was born. Thanks to Arpanet, computers can communicate with other computers over standard phone lines (Lynch 4).

Internet is Born

Arpanet was the granddaddy of computer networks, but others arose as well, all of them at universities or a few corporations such as IBM, which were computer research centers. In the 1980's a great stride forward was made when the National Science Foundation (NSF) in order to extend the benefits of computer networking to non-commercial, academic research, set to link various networks together. Five university locations were chosen as central points of connection to accomplish this, and a network of networks, the Internet, was born (Lynch 12).

Network Owners

Sharon Fisher postulated that no one owns the Internet. Ownership, of course, can be defined as who foots the bill, in which case NSF and the state of Michigan and several major corporations have a claim. Or one could define ownership as who controls the purposes for which it may be used. The users themselves, whether or not they are paying for the infrastructure, can be seen as the owners. If this sounds like power to the people, that is just the way many Internetters like it. The freedom to say what one likes is cherished on all parts of the net (13).

Network Funders

Actually Congress funded it $93,000,000 for Fiscal Year 1992, even more, private companies have kicked in research, hardware, and labor to get it to the point were forty-five megabits per second can pass through on some connections. The average user will not get to use those though (Crowe 14).

Internet - Its Original Use

At first there were, however, many restrictions on who could utilize the Internet and for what purpose. Specifically, the Internet was to be used for research and nothing else. Accordingly, unless users were affiliated with a university, the government, or the research arm of a technical company, users were not permitted access. Each individual network on the Internet had its own set of rules called Acceptable Use Policies (AUP) and the NSF itself had an AUP, but really, they were all pretty much the same - no commercialism, research only.

A clubby atmosphere ensued. Since Internetters were either government techies, company techies, or university techies, there was a commonalty of interest and a like-mindedness of philosophy. A general penchant for science fiction gave rise to the Cyberspace concept and the feeling that there existed here some sort of separate country with its own rules, ethics, and culture. While AUPs were official

statements of rules, there sprang up an unofficial behavioral code which was dubbed, predictably enough "Netiquette." A number of disparate individuals tried to write Netiquette down so the uninitiated would be able to read it and become indoctrinated. That is why today there are numerous versions and special computer jargon which makes it very difficult to educate the masses. Terms like,''boot it up,'' ``go on-line,'' log in,'' execute commands,'' ``upload'' and ``download'' are phrases that are unavoidable in the computer world. (Canter 30).

Internet - Its Commercial Use

In 1990 NSF decided to open the Internet to commercial use. It also decided that anyone at all should be able to get access. Vice President Gore spoke of removing inequality between information haves and have-nots (Taylor 15).

The Internet is like democracy. It may not be the ultimate, but it is the best thing available. Fifty percent of the use is now business. It is a great vehicle for getting buyers and sellers together (15).

The Internet community spans every continent across the globe. The Internet is so large that its size can only be estimated, and it is evolving so quickly that its rate of growth can only be guessed. Vastly more people in the United States, for example, use the Internet than play golf. There are approximately thirty-five million users and about fifteen to twenty million golfers (Seiter 187). The number of hosts on the Internet has grown from 234 in May of 1982 to approximately 3.2 million hosts in July 1994. The edu domain, which is for educational and research organizations, has the most hosts (about 850,000). The commercial domain now has almost as many hosts (about 750,000). (Domains are groups of addresses used to send messages to other Internet users, and host addresses are used to retrieve files and connect to hosts to provide Internet services) (Pike 49). It is so diverse that it uses hundreds of different technologies, and is so decentralized that its administrators do not even know each other. The Internet is an electronic infrastructure that enables intense communications between colleagues, competitors,

and disciplines. Despite these extremes, the Internet community is bound together by a framework of computer communications, networking protocols and infrastructure (Lynch xiii).

<u>Internet - also called Network</u>

Consider Internet as a descriptive term for a web of thousands of inter-connected networks. It is a kind of computer ameba, reaching out and connecting separate islands of computer resources into a seamless web. It connects hundreds of thousands of computers - each of which may then be connected to its own local network. This is why the Internet is often described as a "networks of networks;'' it is just a big collection of individual computers (Miller 10).

<u>Internet - A Digital Library</u>

The Internet digital library offers a variety of services used to create, browse, access, search, view, and communicate information on a diverse set of topics ranging from the results of scientific experiments to discussions of recreational activities. Information on

the Internet digital library can be recorded in memos, organized into menus, stored as hypermedia documents, or stored in textual documents. In addition, information accessible through the digital library can consist of data, including audio and video, that is gathered, communicated, and delivered instantly without being stored. Furthermore, because the services have been integrated and cross-referenced, a user can move easily from the information on one computer to information on another computer and from one access service to another (Comer 265).

There are two very important things to remember about the Internet. First, the information available on the Internet has generally avoided the processing introduced by the mass media. Unfiltered opinions on both sides of any issue ranging from the death penalty to abortion to local taxes, usually are being discussed at length somewhere on the net. Because of the lack of filtering, users may read a bit more about any one subject than they do in the mass media. Second, users get only the information they want (Engst 15).

Internet - Its Common Uses

People use the Internet for numerous reasons, but
the most common uses are:

- o   to retrieve free software
- o   to find and retrieve important documents
- o   to access library catalogs
- o   to carry on long distance relationships and
       conversations with other users;
- o   to conduct research
- o   to connect to supercomputers and
- o   many other activities too numerous to mention
       (Veljkov 1).

Mailing lists and interest groups provide the
richest resources of the Internet. There are hundreds
of lists covering almost every topic imaginable,
allowing individuals with common interests to share
their thoughts and discoveries. By linking
information, computer resources, and human insights,
mailing lists can make the use of all three more timely
and effective (Hardie 1).

Local Vs Global Networks

Local area networks (LANS) are unique because they simplify social processes. While global networks were implemented to make most cost-effective use of computers, local area networks are implemented to make more cost-effective use of people (Madron 5).

LANS should possess the following atttributes:

o high speed and bandwidth sufficient to meet data throughout requirements

o reliability and maintainability

o low cost

o compatibility with a large variety of connected equipments

o flexibility and expandibility

o easy to use (Rorabaugh 149)

On a local area network, the physical link between two computers could be wire, fiber optics or even a "wireless" link using radio frequencies. These links are usually designed specifically for carrying computer data.

On the Internet, the physical link connecting two networks is usually a direct or dedicated phone line

(sometimes called a leased line rented from the phone
company). The most common types of dedicated links
were originally designed for carrying digitized voice
between phone company offices. They work just fine for
computer data, but the use of phone lines for computer
data means the world of telecommunications and computer
networking are intertwined. A dedicated line can be
expensive, as it requires the phone company to install
and dedicate equipment to the link where it passes
through their office. In contrast, a dialup phone line
has a connection into a phone company office, and can
go anywhere from there. These are inexpensive, since
they do not require any special equipment or commitment
on the phone company's behalf (Estrada 2).

The Internet Has Something for Everybody

All kinds of individuals and organizations are
connected to the Internet. Some individuals connect
from home for personal use. Others work from home.
Almost every university is connected to the network,
and an increasing number of K-12 schools as well. More
and more businesses, large and small, are connected to

the Internet.   It can allow a small business to reach
its customers directly, just as it can help large
companies improve communications among independent
units.   An increasing number of non-profit groups and
governmental agencies are getting on the Internet, as
they realize that they have a mission to make
information available for as many people as possible
(Estrada 24).

Large corporations doing business with the
government are mandated to purchase a certain amount of
its raw materials/parts from *small businesses*.   The
Internet is a great resource for locating names and
addresses as well as products for SBA (Small Business
Administration) offices nationwide.   Having access to
this kind of information saves many hours of
researching phonebooks to come up with names and
addresses of appropriate companies (Estrada 24).

The Internet Improves the Bottom Line

Warehouse Wines & Liquors Corp., based in
Stamford, Conn., now counts less on the grapevine than
on an array of integrated on-line resources that give

him an edge on the market and a cachet with his cus-
tomers. Michael Berkoff, wine and liquor merchant,
can still cut a deal the old fashioned way. He can
order 25 cases of Markham sauvignon blanc from his wine
distributor. He can snap up Connecticut's entire sup-
ply of vintage soon to be in hot demand. He knows this
because of a tip learned through the *Wine Spectactor,*
the bimonthly bible of the wine enthusiasts. This on-
line resource has given Markham sauvignon blanc a
coveted top rating in an upcoming issue. Because of
this information Berkoff has cornered the Markham
market (Marx 54).

Amy Miller, CEO of Amy's Ice Cream, a chain of ten
ice-cream stores located in Austin, Tex., with $2
million in sales, used the Internet daily while on
medical leave. When employees in a small company take
time off for medical reasons--it is hard to fill in the
holes while they are out. In a larger company there
are, of course, plenty of people to pick up the slack.
When the office manager and Amy both had babies in 1995
they did not know how they would manage. With the

Internet Amy handled everything from her home with her new baby, Emma, right at her side (Miller 94).

Lewis Fuller, President of Fuller Medical, a 15-employee medical-equipment and supply company based in Gadsden, Ala., with $1.7 million in sales subscribes to a CD-ROM look-up system called Epic Plus, from Medical Data Institute Inc., in Longhorne, Penn. The system goes a long way in helping them compete with larger companies. Every two months Fuller Medical receives updated information in CD-ROM form on a wide array of medical equipment and supplies so they can easily learn about items they might not have in stock. For example, a rehabilitation hospital referred a patient to them who needed a specialized pediatric walker--an item they had never heard of. They consulted the CD-ROM system to learn about it to find a vendor who supplied it, and to get pricing information. Fuller is convinced that now that Pc's are so accessible small businesses can provide anything large businesses can provide and just as quickly. Fuller is currently working on a bid with an agent in Kuwait City. Before the Interent boom, Fuller probably would have had to live in a big city

like New York, close to freight forwarders and other services in order to get the job. Now he can live in Gadsden, Alabama, where his overhead is low and the quality of life is better and still carry on business. With the Internet small businesses can compete with anybody anywhere (Fuller 94).

Patrick McDonnell, CEO of Spectrum Diagnostrix Inc., a manufacturer of process-control and emissions-monitoring instrument in Andover, Mass., with more than $1 million in sales, uses the Internet every day. McDonnell is able to communicate with customers and suppliers without regard to time, place, and sometimes even cost. Historically, that capability was limited to large companies because only they could afford to have worldwide marketing teams. Even though Spectrum has only 20 employees they communicate with customers all over the word without having to travel. They sell to customers in Europe and Asia and have strategic partners in offices located in Munich and Singapore. With the help of the Internet they were able to form strong partnerships. These partnerships allowed Spectrum to gather marketing information from customers

around the globe. They were told when to add
performance capabilities and modify some features in
their emissions-monitoring instruments. This is the
kind of information they would not have thought
important enough to act on if it had not been for daily
communication with the partners (McDonnell 92).

Jordan Ayan, President of Create-IT Inc., a small-
business consulting firm in Naperville, Ill., with more
than $4 million in sales uses the World Wide Web to
advertise. Jordan insists that the Web puts small
business on equal footing with much larger ones. In
the past the costs of advertising nationally have been
prohibitive for small companies. Small businesses can
advertise to a national audience. Jordan does not
think the Web reaches significant numbers of people
yet, but in three years or so it may be a very
competitive advertising medium. It may even surpass
television advertising in popularity (Ayan 96).

One creative marketer, Karlyn Wolf Gibbens,
author, used the Internet Chat feature to her own
advantage. Gibbens wrote and self-published a book
called Marrying Smart: A Practical Guide for Attracting

Your Mate. She had a difficult time finding mainstream publishers to either publish or distribute her book, so using her desktop publishing system, she decided to do it herself. Gibbens was a subscriber to America Online. American Online has a number of singles chatrooms where a book on attracting a mate would logically be of interest. Gibbens, seeing a good potential audience in Cyberspace, thought it would be an interesting idea to go on-line, telling those in the singles chat area about the existence of her book (Canter 111).

Perry Lopez and Monical Bosserman Lopez, owners of Hot Hot Hot Company, were eager to broaden sales of their specialty hot sauces and foods. They wanted to set up their own site on the World Wide Web. Setting up a small but sophisticated site required an outlay of as much as $30,000 which they did not have. Instead of listing all 450 products the partners decided that only 125 of the products needed to be listed alphabetically by heat level, country of origin and ingredients. They hired one of their regular customers who ran a Web service company named Presence to develop a 20-page

site for $20,000. Presence is also receiving a
percentage of on-line sales. Once the development cost
is paid off, the retailer will pay 5% of on-line
receipts as a monthly maintenance fee, which will
continue to cover transction processing.

The Internet is Better for Business

Information Superhighway was born and a flood of
opportunities opened up to the world of communication.
Information Superhighway provides a mechanism to sell
better, faster and cheaper than anyone ever thought
possible.

Looking at the basic business success principle,
the first element is "better." For marketing, it means
that instead of simply sitting in front of a television
or reading a magazine, quietly watching an
advertisement pass before the user's eyes, the user
can, in some way communicate back to the seller the
level of interest, questions, or desire to purchase.

The Internet vs. the other Medias

An advertisement, whether in print or on television, is costing the car manufacturer a bundle to put that ad in front of the consumer without counting advertising production expenses. Because standard media charges increase according to the amount of space or time the ad takes up, the advertiser has two main goals in mind: grab your attention and keep it short. In order to grab your attention, the advertiser uses a number of techniques. He or she may choose some intense-looking hard bodies as models. Viewers can watch them driving cars at high speeds up beautiful mountain roads that most of us will probably never see in our lifetime. The different techniques used to get attention are fun, but once the curiosity has been piqued, there are lots of questions that need to be answered. Unfortunately, if it's past business hours when the ad is shown the viewer cannot go to a phone and call the dealership. The questions remained unanswered. By the time the viewer goes to bed and gets up the next morning, he or she has forgotten about the car altogether (Canter 35).

Now if the consumer were to apply the interactive feature, he or she could turn on the computer and find Cyberspace auto mall. There is a selection of dozens of auto manufacturers. One key stroke and an Infiniti appears on the screen. There are three models to choose from, the G-20, J-30, and Q-45, each with the suggested base sticker price underneath. Selecting the Q-45 shows specifications of the car. The ability to access several different independent reviews of the car is available with one key stroke. Once the consumer selects a car the computer will proceed with a demonstration with a close up, full-color picture of the Q-45. With the touch of another key stroke, the driver's door opens and a full view of the instrument panel appears on the screen. At the bottom of the computer screen flashes the message, "Want to take a test drive?" Of course? Responding with a "yes" transforms the computer screen into a car simulator, much like the flight simulator video games have. Certainly, a simulation is not the real thing, but the computer gives the feeling of being inside that Q-45,

driving around town, through the mountains, even in the Indy-500 race track (Canter 36).

When the test drive is over, a list of possible options to put on the car, such as fancier wheels, gold packages, CD players, telephones, etc. appears on the computer screen. Choices of colors and interiors are also presented. As the consumer clicks on each option, the picture of the car changes on the screen to reflect each new choice. This gives the consumer the ability to design the car from the screen. When the exact selection has been made the total price appears at the bottom of the screen, along with the name of the nearest dealer who can provide that exact configuration for the consumer. The buyer can contact the dealer via e-mail, who will subsequently call to arrange for a personal showing of the real thing, or perhaps give the option to make the deal right on-line. No more spending hours in the show room while the sales person goes back and forth from the manager's office to the consumer and then back again. Buying a car could not be easier, or more enjoyable (Canter 36).

National Research and Education Network

The National Research and Education Network (NREN)
is revolutionizing American education by giving
teachers new tools and new ways to inspire their stu-
dents. This data is transferred at speeds in the
gigabyte-per-second range to form the infrastructure
for U.S. scientific and industrial research. Today,
hundreds of elementary and secondary schools are linked
to the NSFNET (National Science Foundation's Network)
enabling students to exchange messages with other stu-
dents throughout the country and enabling teachers to
share new teaching ideas with one another (Smith 19).

The Internet is Faster

The second element for the basic goal for success
is speed. Computers are known for the speed in which
data can be processed. Electronic data travels at
blinding speeds. A signal travels around the world in
fractions of a second. To demonstrate how computer
marketing is faster, consider the long-standing staple
of direct marketers, the mass mailing. The old-
fashioned method requires that the user first needs to

design a mailing piece, including both art and copy.
Once that is done, it must be converted into camera-
ready so the printer can produce the finished mailer.
This in itself make take a few days to a few weeks,
depending on its complexity. Then the art goes to the
printer. Once the printing is completed, the envelopes
are stuffed, mailing labels are pasted and the entire
mailing goes to the post office. This whole process
could take weeks.

With electronic publications, ad copies must still
be prepared, but the circulation can happen at any
time. It appears on the customer's computer screens
within minutes after it's posted. Using the old-
fashioned method, even a publication as speedy as the
daily newspaper will require at least a few days before
the ad is seen. In addition, customers can contact you
instantly via e-mail. Computers can send additional
information automatically by computer on request,
without having to lift a finger.

The Internet is Less Expensive

The third element for the basic goals for success is expense. Estimates on Internet participation vary, but the most quoted figure seems to be that of thirty million. Moreover, that number grows by a mind-boggling amount every day. Estimates vary, but the one most quoted by the on-line services sets the increase at about ten thousand new users per day (Canter 40).

Price is always a paramount consideration. The least expensive price to reach 1,000 people only one time is $7 in a national magazine, $7 on the radio, $16 on television, $31 in a big city newspaper, and a whopping $330 by direct mail. It is no wonder big companies get most of the business. Who else could afford even a thirty second spot on a program with a big viewership like "Seinfeld?" Who else, for that matter, could afford to advertise on almost any network program, while facing the imminent threat of cancellation. At least on the I-way, the playing field is level. It costs 3.3 cents to reach 1,000 Netters for a solid month (Canter 45).
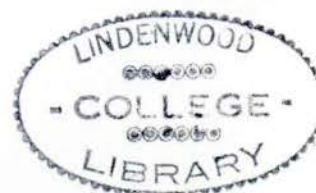
The Internet Acts as a Barometer

The Internet provides a vehicle to test market products with no financial risk. It is always a good idea to see if a product is going to sell or not. This is often impossible in traditional markets, especially if there is no budget. Many direct marketers have to make a profit on every advertisement they run. The price of one ad can put them out of business if it does not work. The Internet solves this age-old problem handily. The cost of advertising is so low that mistakes are affordable. It is so easy to find out right away what potential customers like or dislike about a product. Placing notices on a few relevant Usenet groups and simply asking if people find the product interesting and reasonably priced is enormously less expensive than the traditional method of test marketing (Canter 55).

The public is only just now becoming familiar with all the Internet and what the other interactive services have to offer. As each person goes through the process of learning about the wonders of the I-way,

they usually become enthralled with what they find there (Canter 38).

There is actually relatively little advertising on the I-way at the present time because it is so new. This is also due to the prior "nothing commercial" Internet Acceptable Use Policy of the National Science Foundation. Those who begin to use it as a marketing tool will be among the first and will, therefore, stand out! This window of opportunity to be the first will not always be open. It will not be long before every day businesses of all sizes race to jump on the I-way bandwagon. The chance to be a leader is there now for those who are smart enough to take advantage of it (Canter 38).

As viewed on the Internet, advertising is intrusive, whereas marketing can be active and discourse-based, and can provide valuable information and services as part of its efforts to sell products and services. Businesses must be seen to be contributing back to the net. The key to living comfortably with network neighbors is to observe the simple rule that solicited information is good, but

unsolicited is not. Businesses for the most part have to make a paradigm shift from something highly intrusive and image-oriented to something highly content-oriented (Ellsworth 64).

Internet Feature

Chat and talk features on the Internet and other on-line services have surpassed the telephone-like capabilities of e-mail. Although there is enough speed possible with e-mail exchanges to make a conversation viable, there is still a delay, sometimes of several minutes or perhaps even hours, between the time your message is sent and when it gets to its destination. There is no such delay with talk or Internet Relay Chat, better known as IRC (Canter 106).

Talk is the name of a common type of software program that opens a direct line of communication between two computers. Anyone who is a member of the same network can use the computer talk feature. Individuals can talk to each other while sitting at their respective keyboard by typing messages back and forth. There are no long-distance telephone charges,

other than the cost of Internet access. This is a
great advantage for businesses to be able to access
information instantly rather than write a letter or
wait for a phone call to be processed (Canter 106).

Internet at Home

In 1995, four million people will be working at
home, according to data from Forrester Research
(Cambridge, MA). That estimate may be conservative,
however, as more and more North Americans are finding
it acceptable to work at home (McMullen 3).

The Net offers a wide menu of information and
services for anyone trying to get down to work in his
or her den. Indeed, the biggest problem of working at.
home--loneliness--is nearly solved by the opportunities
to chat with and complain to other people trying to do
the same thing (Rutten 141).

The Working from Home Forum on CompuServe offers
straightforward guidance on setting up, from software
to tax issues. The forum also gives people who work at
home news, software, tips on homeoffice management,

legal information, marketing advice, and other
resources (141).

The reason more businesses have not hooked up to
Internet Relay Chat is because of security. The
thought of competitors reading private information is
unnerving. This stuff happens in real life too.
Cellular phones in Silicon Valley have been the source
of all kinds of corporate leaks, through random and
purposeful eavesdropping (Seiter 187).

Internet Regulations

Recent newspaper reports claim that police in
large U.S. cities have taken to signing onto different
local bulletin boards and Internet Relay Chat sessions
in an attempt to identify pedophiles who want to lure
12-year-olds into motel rooms. Police departments
react to the need to present themselves as high-tech.
Stories about other plans to entrap drug traffickers on
the Internet are certain to be publisized. The
accumulated weight of these stories will be used as a
justification for more Internet regulation (188).

Internet Security

Terisa Systems Company, a joint venture of RSA
Data Security and Enterprise Integration Technologies,
announced recently that it will sell software tools to
help programmers design security systems into Internet
telecommunications applications. This way, business e-
mail would be absolutely private (187).

Ironically, RSA was a pioneer in the kind of
encryption technology that the government is trying to
impose on all telecommunications with the controversial
Clipper chip. The Clipper chip lets you put messages
into code that no one but the intended recipient and
law enforcement agencies can read. The biggest
organization of Internet users, Computer Professionals
for Social Responsibility, has issued a statement
against the Clipper that includes 50,000 signatures.
It looks like a ``Who's Who'' of the computer business
(187).

Internet Program Tools

There are many forms of advertising on the
Internet. There are such methods as File Transfer

Protocol (FTP), Gopher, and the World Wide Web. The idea of building a store on the Net is one concept currently being used to describe what I-way can do. These "stores" are in fact data sites that can contain, among other things, advertising and information about a product or service. If the product is in itself information in some form, such as a book or recording, establishing a site, the Internet public is invited to enter the company's computer and see what is being offered (Canter 113).

A team at McGill University developed a tool called Archie to provide an index of anonymous FTP archives. If a user is looking for a particular file, whether it be public domain computer program, a NASA photograph, or monograph someone has written, the user would face a most tedious search process. With Archie, the user can locate files quickly. Archie operates on the client/server model. There are a number of Archie servers around the world. Periodically, through a cooperative effort among these index servers, anonymous FTP servers around the world are polled as to their current collection. An index of all the holdings on

all of these FTP servers is built and propagated among
the Archie servers. Users can interrogate an Archie
server, which consults this index and lists all
anonymous FTP sites that hold the sought files (Wiggins
272).

The gopher service is an interactive menu-driven
browser. When gopher runs, it displays a menu of
choices. The choices usually consist of short, self-
explanatory phrases in English (Comer 191).

Conceptually, each item on a gopher menu denotes a
file of information or a reference to another menu.
The user scans the list of items on the menu and
selects one of them. If the selected item corresponds
to a file of information, the gopher software retrieves
the file and displays its contents; if the selected
item corresponds to another menu, the gopher system re-
trieves the new menu and allows the user to select an
item from it. The point is that the gopher information
browsing system is menu-driven. By selecting an item
from a menu, a user can retrieve information (192).

Anonymous FTP is one of the oldest ways that
information is offered on the Internet. Archie, in

turn, was the first widely deployed Internet index scheme. As gopher gained popularity through 1992, it became obvious that there was a need for an analogous tool in Gopherspace. In November 1992, Steven Foster and Fred Barrie of the University of Nevada announced a service that could search document titles across many Gopher servers. Other tools had been developed that allowed searching within a Gopher's hierarchy; their new tool could search across Gopher servers worldwide. Foster and Barrie christened their service Veronica. Supposedly the name Veronica is an acronym for "Very Easy Rodent-Oriented Netwide Index to Computerized Archives." Just as Archie surveys anonymous FTP servers for their list of holdings, Veronica must periodically poll its target servers in order to build a database. A user connecting to Veronica specifies a keyword to search for, say for the word "biology," and gets a list of document titles from throughout Gopherspace that include that string of characters (Wiggins 278).

Jughead is another tool and is available at some Gopher sites. Jughead is like Veronica--except that it

uses the menu items on a single gopher menu as its

database.

The Wide Area Information Service (WAIS) and the

World Wide Web (WWW)are tools to help users search for

files and features. WAIS lets the user look for

specific words or phrases in a file while the web (WWW)

gives files with hypertext hotbuttons built in. Click

on one and the user will be taken to the subject-

relevant portion of a different file (Glossbrenner 47).

Computer experts consider the World Wide Web the

single most exciting development in Cyberspace, and the

place where commercial enterprise is booming. It is

one of the many heavily interactive features the I-way

has to offer. E-mail and Usenet news are fabulous ways

to advertise for very little money. But it limits the

use of short messages, and copies look like they came

from the typewriter. On the World Wide Web audio,

color pictures (full multimedia capabilities) are

available. Moreover, everything can be seen

immediately on the screen while on-line, a feature not

offered by other data sites (Canter 114).

On-line newsletters and magazines are a staple of the World Wide Web. Until quite recently most of the electronic publications available catered to the computer set. Now, more and more mainstream publications are coming out with on-line editions. USA Today, for example, has an electronic edition that can be viewed from some of the commercial on-line services and is subscribed to by a number of Internet access providers. It seems inevitable that the day will come when the daily newspaper will be waiting for the public via the computer each morning and the paperboy, like the milkman, will enter the realm of nostalgia (121).

In the age of computer revolution, where the line between the information ``haves'' and ``have-nots'' is becoming ever more blurred, anyone can start a publication. It can be as short or as long as the writer wants it to be. It can be a newspaper, magazine, or newsletter. How elaborate the publication may be depends on how much time, money or talent the writer wants to invest. The money required, though, is only a fraction of what it would take to start a traditional publication. That is because once it is

ready, the writer doesn't have to worry about getting it distributed. Once it is on the Web millions of people will be able to read it (121).

Mosaic is a tool on the Internet which provides an easy-to-use, easy-to-build hypermedia system operated via pop-up windows, pull-down menus and "point-and-click" navigation. Mosaic has helped fuel an explosion of interest in the World Wide Web and the possibilities of building a true "hypermedia universe" in cyberspace (Branwyn 5).

The Internet also provides a Quicken Financial Planner to help baby boomers plan for their retirement in great detail. Since baby boomers save only thirty-four percent as much as they will need to maintain their current standard of living at retirement, the Quicken Financial Planner is a big plus for gaining insight to how much money should be set aside each week. Given the user's birth date and a few personal details, Quicken Financial Planner will predict life expectancy. Quicken takes into consideration expectant retirement date, inflation, current home and its projected sales date, tax consequences, social

security, medicare, etc. After the user enters all the
pertinent data, Quicken Financial Planner delivers a
financial plan in an extensive series of graphs and
reports with considerable commentary on the user's
weak points and suggestions for improvement (Hogan 77).

Bookstores have rapidly become one of the most
popular businesses on the Internet. Booksales are a
type of business uniquely suited to the information-
rich environment that the Internet offers. With shared
ordering, capability and references like *Books in
Print,* the challenge of differentiation for an
electronic bookstore also offers an advantage to the
small chain; unlike a walk-in mall, the investment
required to have an attractive and interesting Internet
shop is minimal (Resnick xxxiii).

The Online Bookstore of Rockport, Massachusetts is
a one of the bookstores already on Internet. Internet
readers order and receive books electronically by
typing their credit card number. Once the number is
typed, an electronic copy of the requested book is
instantly transmitted to their computer through the
Internet, saving them a trip to the bookstore.

Distributing books on the Internet is a faster and
cheaper way to reach readers than traditional
publishing methods. Because there are no paper,
printing, binding, or warehousing costs to worry about,
books can also be produced at half the normal price.
Only a limited number of titles are available through
The Online Bookstore. Two popular electronic texts
offered through The Online Bookstore range from a
comprehensive guide to bed-and-breakfast lodging to an
oral history of sexuality. Cost and speed are not the
only advantages to online publishing. The Internet
also enables publishers to do things they cannot in
print or even on CD-ROM, such as linking electronic
books to far-flung databases containing related
material on music, video, photos, and other texts on
the worldwide network. An art history book, for
example, might include a link to a library of images
from the Vatican's collected of sculpture (xxxiii).

A good example of one commercial on-line service
is CompuServe's vast electronic mall. Here, product
promotions from various businesses are grouped together
to offer one-stop shopping. There is information from

many different merchants. The cost to a small business
of marketing products on these malls is in the
stratosphere. A figure of $20,000 per year plus a
percentage of gross sales was a price recently quoted
by CompuServe, and that is for reaching CompuServe
customers only, excluding those on the Internet.
CompuServe could go full speed ahead by providing
Internet access thereby expanding its audience to
unlimited boundaries. The stiff prices will remain or
even increase but the results are extremely lucrative
for the participants (Canter 115).

UNIX Commands

The Web is an intricate indexing system that
enables users to hop very easily around the Net. The
Internet is a huge place. There is an entire universe
out there filled with endless amounts of information.
The array of scientific research data stemming from the
Internet's roots is there for everyone to see. On the
Web, contents of entire libraries are there for the
taking. There are satellite photographs of the plants
or the latest high tech art (Canter 115). The problem

is being able to locate the information you need. It
is a real challenge for newbies and even experienced
Netters to find the specific item of information
needed. An added difficulty is that even if the user
knows where on the NET a particular piece of data is
located, the user may have to type in arcane electronic
addresses and UNIX commands to arrive at the right
place in Cyberspace to retrieve it. UNIX, the complex
computer language on which most Net-connected computers
operate, is nothing the average user would wish to
tackle. The other great contribution that Web makes to
the Net, in addition to on-line multimedia
capabilities, is a solution to the complexities of the
searching problem. That solution comes in the form of
a programming vehicle called hypertext links (Canter
116)

Hypertext links, although generally intended as a
research tool, have turned out to be one of the
Internet's fun features. They enable the user to
engage in something like a treasure hunt because hidden
under every item looked at is another link to other
related items. With the point and click system, the

user can view more on the screen than just plain type. The user can view graphical pictures as seen in magazines (Canter 116).

Virtual Reality

Virtual Reality (VR) uses a computer to simulate an interactive environment that appears to the observer as another reality. A VR system uses special hardware and software to give your senses enough information to allow you to suspend your disbelief about realities and imagine yourself present in another world. In a sense, VR systems pick up where watching a movie or reading a good book leave off (Eddings 153).

There is no doubt that the virtual mall will make lots of money for lots of people. Imagine owning a shopping mall, complete with artisans hawking there wares, large department stores fancy boutiques, movie theaters, penny arcades, food courts, and that popular mall staple, people watching. Malls are beginning to pop up all over the Information Superhighway. The companies that build the malls charge other business to "rent" stores there. In concept, virtual malls offer

the same benefit as real-world malls. There is
strength in numbers. Shops group together because a
lot of them in a single place make a bigger splash and
attract more people than one by itself. When shoppers
go to a real-world mall they intend to buy from a
particular store but while they are there, they cannot
help seeing others and end up buying something from
another store. (Canter 119).

It would cost tens of millions of dollars to
construct a large shopping center well. This is beyond
the means of most individuals. A mall in Cyberspace
containing most of the same features can be owned by
almost anyone with a personal computer, strong Internet
access and a little imagination. Developing a
Cyberspace mall hardly costs the millions of dollars or
years of planning it takes to build the real thing.
Creative concepts, fancy artwork, technical know-how
and dedicated Internet line are all that is necessary
to build a Web shopping conglomerate. If a shopping
conglomerate appears to be too much, buying "store
space" in a mall might be the answer (Canter 120).

Telepresence uses a video camera mounted on a robot to send pictures to an operator at another location who manipulates the robot by remote control. Telepresence and VR both require many of the same hardware devices, such as head-mounted video displays and data gloves that sense the position of the wearer's and transmit that information to a computer. Telepresence differs from VR in that the computer duplicates the interactive environment rather than simulating it.

Telepresence requires video data and commands for positioning and controlling the robot to be transmitted between the operator and the robot. Telepresence gives the operator a sense that he or she is present with the robot; the robot's arms are an extension of the operator's arms, even if the robot is located across the world. More and more virtual-reality applications are becoming practical, and as audio and video transmission over the Internet become commonplace, the Internet and VR will meet in many areas. Telepresence surgery, where a doctor at one hospital operates on a

patient located at another on the other side of the world, will be possible in the future (Eddings 153).

The clinic will need a remote manipulator or robot, along with special equipment to process all the signals that will have to be sent across the Internet for telepresence surgery. In addition, a surgical team will need to be present to handle the surgical prepping and other tasks.

Telepresence surgery requires three-dimensional video; fine motor control; and tactile, or touch, feedback, to be successful. This information can be digitized and sent across the Internet between two distant sites, allowing a specialized doctor at a major hospital to operate on a patient at a rural clinic. Students or other doctors could observe telepresence on a monitor at another Internet site (Eddings 154)

The doctor's motions will be duplicated by the robot. The robot will be equipped with a stereoscopic camera that provides the two images the doctors VR goggles need to create a three dimensional image. The doctor will operate in a virtual operating room as if he or she were present at the remote operating room.

The robot's arms will be fitted with tactile sensors that will send information about position to tactors in the doctor's data gloves so he or she can feel what the robot's "hands" feel (156).

The doctor's movements will be digitized and sent to the robot, while the image of what the robot sees and the pressure it feels will be sent to the doctor through special equipment that communicates via TCP/IP (Transmission Control Protocol and Internet Protocol) packets over the Internet. The Internet will provide a secure path for these packets. If a pathway fails, routers on the Internet will instantly choose another path, just as they do for regular traffic.

Sometimes it is impossible, or very difficult, to get a patient to a specialist. Telepresence surgery would allow a single specialist to treat patients all over the world, without the patient or doctor have to travel far; they would not even need to be in the same room (156).

There will be many other uses of VR over the Internet, in fields ranging from medicine and engineering to space exploration and recreation.

Multiple-user dungeons, or domains (MUDs) already
exist, allowing a group of players to join in the same
game (157).

Internet Potential

As Internet travels the world its possibilities
grow with every new user. The telecomputer which is a
combination of Touch-Tone telephone, fax, and computer
with pen-based or touch screen input using a flat-panel
display connected to telephone lines will become a must
in the world of business. It will be used for services
such as information-on-demand, fax-back-on-demand,
purchasing items, and picture-phone functions. It will
also send signals to and received signals from an
interactive television. Visual voice boxes will be a
popular feature (Burrus 344).

Desktop videoconferencing

Desktop videoconferencing is similar to a
telephone conference call that includes live video.
Each person uses a personal computer, a small video
camera mounted on top of the computer monitor, and a

broadband data transmission system that allows the user to see the other parties on the computer screen as they all interact with the information (344). Today, only the largest corporations can afford this type of setup, but in the future most organizations and even our homes will have access to this technology (Kee 29).

While the transition in our industrial history is significant and exciting, Roszak contends that the mind is as close to being a wonder of nature as any miracle revered by the religions of the world. To reflect on the powers of the mind, to probe its secrets, these are among the time-honored pursuits of philosophy. It is quite another matter, however, to teach children and tell the public that the secrets have all been revealed and the powers harnessed--and to offer collection of semiconductors in a metal box as proof. Measured against that claim, even the most ingenious computer is bound to look ludicrously inadequate in the eyes of thoughtful people--more of a joke than an achievement (xii). The computer is only as valuable and as powerful as the human that created its contents. The true art of thinking is still clearly only accessible

within the human mind. It is possible that the rising
generation of students will be seriously hampered in
its capacity to think through the social and ethical
questions that confront us as we pass through the
latest stage of the ongoing industrial revolution.

Internet's Bad Side

One major drawback for big corporations connecting
computers to Internet is the time spent by employees
familiarizing themselves with it. Productivity costs
soar as employees explore the Internet. There is so
much to see and understand that hours go by with no
product at the end to justify the time spent purusing
the system. When this time spent by one is multiplied
by hundreds of employees doing the same time, cost
becomes a real factor.

J. C. Hertz, author of ``Surfing on the
Internet,'' compares the Internet to a carnival gone
awry. He says it is like elbowing through a department
store on Christmas eve, with all those cosmetics ladies
trying to spritz customers with cologne and five more
people to go on the Christmas list and there is always

the question as to what to get them or where to look
and the clock is ticking toward closing time. Mall
mania. Too many choices. Too many people. Hertz
emphasizes that after thousands of hours in front of a
computer screen users become shell-shocked. There are
too many threads that are not worth the time but scream
to be read all the same (200).

Currid emphasizes that computers and networks are
not magic although they are necessary. They do not do
things for for the user. Rather they help the user get
things done. It sometimes requires creativity and a
little patience to derive the most benefit from
computers; but, with a little imagination, tremendous
possibilities for improving a company's productivity
and efficiency are at the user's disposal (5).

It is important that only employees with a need,
be connected to the Internet. It is imperative that
these same employees get proper training before they
spend weeks trying to get acquainted with the system.

It is always a good strategy to analyze what the
needs are before deciding exactly what program to use.
When buying a new automobile, basic questions include

budget, fuel efficiency, size, utility, reliability, and so on.

Identifying Internet Needs

For an Internet connection, the best strategy is to spend some time identifying information needs and budget before choosing a connection. The following considerations should be made:

- Hook up for one person, a small group, or a larger department or company is dependent on the expected outcome.

- If the business is going to provide information to others on the Internet or is the business going to be only a user is dependent on exactly who within the business has access.

The following is a checklist when assessing the Internet connectivity requirements.

- Companies expecting yearly growth should expand access to more users within the company.

- Businesses located all in one office with computers connected on a single local area

network should consider expanding to additional areas

Companies having multiple sites scattered throughout the state, country, or even the world should definitely find a way to connect via the Internet

- Do not access users unless there is a direct tangible benefit associated with their access, for example,ease of workload, more productive, or just better information available to the user.

- Consider all the Internet features before connecting to just the most popular or the latest technology (electronic mail, discussion groups, gathering, marketing, remote site collaboration, file transfer, or real-time conferencing).

- If more than one employee needs to log on at the same time, multiple access will be necessary to increase productivity.

Determine exactly how the the company will be spending on the phone, fax, overnight delivery,

and other communications tools to determine if access is cost effective.

The commercial world now dominates Internet use. More than 80,0000 companies are connected. Among them, they have more than 3.2m Internet hosts, each of which may support individual users. Some of them are joining as consumers, but many of them are there to sell. For the moment the market is probably small; estimates put it at more than $100m last year, but its potential is huge. Analysts point to the existing $53 billion catalogue and $2.5 billion TV home-shopping markets worldwide, and they wave surveys showing that the average Internet user earns 50% more than the national average and likes mail-order shopping (Jenkins 13).

Whether a small business operating out of the home or a multinational corporation sprawled across the globe, it is hypothosized that savings in the business overhead will be realized once connected to the Internet.

Chapter III

SELECTIVE REVIEW AND EVALUATION OF RESEARCH

Internet's Server

The Wide Area Information Server (WAIS) is considered the center of a whole new network-publishing industry serving as "the printing press company for an electronic age." The WAIS software is designed so that a user can select databases around the world, then enter a question in natural language, like "find information about the common market and interest rates in German." WAIS transmits the query across networks to selected sources and returns with headlines from documents matching the relevant terms, displayed on the searcher's work station. The results of a search are displayed in order relevancy, offering the opportunity to scan and request more documents based on the closest matches. Information is accessible regardless of format: graphics, video, audio, and spreadsheets were as retrievable as text documents (Cronin <u>Doing Business on</u>. . . 17).

One of the first projects for WAIS, Inc. was to provide an information system for the Ross Perot's Presidential Campaign organization. Perot supporters used the system to keep campaign offices in all fifty states up to date on internal materials and current publications. They entered news clippings and all press releases into a WAIS-searchable database to ensure that field and headquarters shared the same information. As it turned out, the campaign results did not hinge on information access, and Perot's withdrawal from the race put an end to this application. However, Perot Systems was sufficiently impressed with WAIS to become a customer in its own right (Cronin Doing Business on. . . 18).

Other people's success stories and hard-won lessons can be instructive, but in the end the value of the Internet for any business depends on matching network capabilities with that company's priorities. Internet connections can reduce communications costs and extend the effective reach of large and small corporations. The network has demonstrated its ability to enhance the support services provided by hardware

and software vendors to keep vital automated systems operating at peak efficiency. Marketing departments are using the Internet to determine customer response to new products and to provide information to a new base of networked consumers (Cronin <u>Doing Business on</u>. . . 239).

<u>Success Stories - How They Did It</u>

Michael Berkoff of Warehouse Wines & Liquors Corp. counts on on-line resources that give him an edge on the market and a cachet with his customers. As Warehouse's president, he oversees the company's customized inventory-management system, a Novell-run network that instantly links register sales to inventory records. He uses a specially adapted software packet to forecast market trends and consumer buying patterns, and also maintains an extensive customer database. Last year he set up shop on the World Wide Web, using the site for both marketing promotions and credit-card sales. The Web site has been so effective that Berkoff projects that 10% of the company's expected 1995 revenues of $12 million will be

generated on-line. With his old system, Berkhoff's inventory records lagged a day behind sales. If the store ran out of an inventoried item and had to sell a new item that had not yet been inventoried, the item was keyed in as ``miscellaneous.'' The inventory was always off hundreds of items a week. Adapting a program designed by Atlantic Systems specifically for liquor stores, computer consultant, David Bialik, outfitted Warehouse with five computers that serve as cash registers and log inventory through the Novell network, giving the store an up-to-the minute, item-by-item rundown of its stock. The store was able to reduce out-of-stock problems by about 80% and Berkoff knows to the second what they have sold (Marx 52).

Amy Miller, CEO of Amy's Ice Cream, managed the office from her home. With her Macintosh PowerBook and a Style Writer ink-jet printer, she did everything at her home computer. She handled all of the company's accounts-payable transactions using Quicken. She could modem the payroll information directly to the payroll company. Amy was able to apply for a loan from the Small Business Administration by compiling all the

historical information needed for the application
without going into the office. Amy even designed a new
bonus plan at home for all the managers using the fax
modem on her computer to send and receive information
from the office (Miller 94).

Patrick McDonnell, CEO of Spectrum Diagnostix,
Inc., depends on the Internet to communicate with
customers all over the world. Using Internet, E-mail,
and other types of technology, Spectrum has been able
to form stronger partnerships. With strategic
partnerships, small businesses can develop vertically
integrated teams, like Spectrum with the Canadian
company, teams that have the flexibility and
versatility necessary to compete with large businesses.
Historically, tools like networking databases were
limited to large companies. Spectrum now has access to
those databases simply by paying an on-line fee.
Through those databases they can get basic research-
and-development information. For example, Spectrum is
based mainly on the use of a tunable diode laser that
produces light that travels across a fiberoptic link.
It is how the phone system works. Until 1990, lasers

were very expensive to use. But, over the past ten years the industry has conducted research on lowering the price of using lasers. That research has been published on the Internet and in large databases maintained by the Small Business Innovation Research program in Washington, D.C. It has helped Spectrum develop its products (McDonnell 92).

Lewis Fuller of Fuller Medical took advantage of his CD-ROM system to learn where he could find a specialized pediatric walker, an item a rehabilitation hospital requested for a patient. The CD ROM system immediately found a vendor who supplied it and also provided pricing information. The system has given Fuller Medical the reputation of finding the unusual and allowed it to pick up many customers that larger companies do not want as clients (Fuller 94).

Jordan Ayan, President of Create-IT, Inc., is convinced that using information on the Internet gives him an enormous amount of credibility. Now with a couple hundred dollars a month and a little knowledge about how to design a Web page, the small business person can advertise to a national audience. Not only

does he advertise on the World Wide Web, he uses
CompuServe's on-line news clipping service. One day,
before a meeting with one of his major Fortune 500
company's divisions, he checked the latest news
clippings. He read that this particular division was
being sold to IBM. At the meeting he said to the group
manager, ``So I guess you guys are going to be wearing
white shirts pretty soon.'' The group manager had no
idea what he meant since the news had not filtered
through the organization yet. He was shocked but
impressed with Ayan's insight (Ayan 96).

One thing that slows down traditional large
corporations is the inefficient flow of information.
Small businesses do not have that problem. They are
champions when it comes to moving information and
information technology lets them communicate even
faster (96).

Author Karlyn Wolf Gibbens wrote and self-
published a book called _Marrying Smart: A Practical
Guide for Attracting Your Mate._ Since she was a
subscriber to America Online she saw a potential
audience in Cyberspace. She joined groups and started

talking about the book to anyone who would listen. To those who expressed interest, she would send a sample from her book by mail, together with data on sales orders (Canter 111).

Perry Lopez and Monical Bosserman Lopez opened a small retail shop called *Hot Hot Hot* in Pasadena, California. They hired one of their regular customers who ran a Web service company, named Presence, to develop a 20-page site for $20,000. They decided to list 140 of their 450 products, organized alphabetically and by heat level, country of origin, and ingredients. Anxious to process sales immediately, the partners decided to open the site without transaction-encryption software and were surprised to find that half of their early orders arrived on-line with a credit card number--and that portion is now up to 75%. They also used their 800 number on the site. Presence is also receiving a percentage of on-line sales. Once the development cost is paid off, the retailer will pay 5% of on-line receipts as a monthly maintenance fee, which will continue to cover transaction processing (Hise 83).

Research and development divisions at Fortune 500 corporations depend on the Internet or Internet-compatible networks to share information with research partners in corporate, university, medical, or other settings. Some companies have made an Internet connection a fundamental requirement for new business partners. Others describe the network as an essential ingredient in internal collaboration and teamwork among branch offices in remote locations (Cronin <u>Doing Business on</u>. . . 239).

The Internet also serves as a mechanism for sales and product distribution. As more individuals and organizations establish Internet connections, the number of products available over the network is on the rise. Even when direct sales are not desirable, the Internet provides an option for electronic product catalogs as well as enhanced customer communication and support (Cronin <u>Doing Business on</u>. . . 249).

Fortress, Inc. has several research centers in this multinational manufacturing corporation which established Internet connections in the 1980s as part of federally funded projects using supercomputer

resources. Use of these connections was strictly limited to research application to ensure adherence to the National Science Foundation's Acceptable Use Policy. A separate, dial-in connection was established in 1990 by corporate Library and Information Center to access various bibliographic and document delivery resources available over the network. Because there was no internal Internet training support available, and only limited resources for outside training, this connection was designated primarily for library use and not publicized to the rest of Fortress, Inc. (Cronin Doing Business on. . . 242).

Balanced Business, a medium-sized service company with branches in seventeen countries, selected a dedicated commercial Internet connection in 1991 with two objectives in mind: saving money on internal communications and travel costs, and providing better technical support to overseas customers. In preparation for the Internet connection, Balanced redesigned its enterprise communication network to utilize TCP/IP architecture. Even though many of the company's computer and technical groups were quite

familiar with Unix systems and Internet applications, a small implementation team worked to develop an in-house Internet training program accessible to all employees, including marketing, sales, and customer support divisions. Training materials were distributed to each branch office and an Internet Liaison was selected for each site to coordinate the details of connectivity with headquarters. An Internet Advisor bulletin board on the internal network features new Internet resources and training tips, and answers questions from anyone in the company (Cronin <u>Doing Business on</u>. . . 245).

In addition to USENET newsgroups, Balanced Business subscribes to the ClariNet news service, with a special emphasis on technological developments and international news for employees dealing with overseas locations. The company library also set up a scanning and current awareness services for selected "hot topics" of interest to management, development, and other departments (Cronin <u>Doing Business on</u>. . . 245).

The company's Management Information Systems' department drafted and circulated network use policies as part of the Internet training package. These

included security procedures, company policy on use of
public domain software and other data, generally
acceptable network behavior, and guidelines for
personal use of the network for e-mail or nonbusiness
discussion groups, among other topics. Security for
the Internet gateway was designed to facilitate remote
access to the network for traveling employees, and full
access to existing and experimental multimedia
applications, without compromising the company's
internal database (Cronin <u>Doing Business on</u>. . . 246).

After one year of operation, a simplified cost-
benefit analysis and customer survey showed that
Balanced had achieved its original goals--
communications costs were down and customer
satisfaction was at a high point. Other company
divisions had proposed a number of additional
applications, and those were regularly reviewed by
management to ensure a coordinated (Cronin <u>Doing</u>
<u>Business on</u>. . . 246).

Balanced employees see the Internet as a useful
tool for getting the job done. Many express enthusiasm
for the new perspective it offers them on the company's

business partners, and colleagues in distance branches.
They like the regular updates on new Internet resources
and the availability of navigational tools for locating
software or other useful materials on the network.
Branch offices are able to exchange data, work more
effectively on development projects, and participate in
companywide planning sessions. The target for reducing
travel and communications costs had been more than met.
Based on these results, management has set up a small
group to investigate the costs and benefits of using
Internet for marketing and customer support activities
(Cronin Doing Business on. . . 246).

Every regular Internet user has a favorite
anecdote about how the network brings the world to his
or her desktop. Ted Sickles, manager of data
networking at Rockwell International, recalls an
incident that occurred when he was visiting a Rockwell
site in London:

> I checked my e-mail, and along with the
> more routine messages, I found a request
> from a person somewhere in China asking
> for information about a particular chip
> that Rockwell manufactures. I did not
> know anything about that topic, but I
> used e-mail to forward the message to
> the appropriate person back in Newport

> Beach, California. He contacted the
> Rockwell support people in Japan, and
> they were able to reach the person who
> made the original query with an answer
> via the Internet. There is no way to
> provide that kind of responsiveness
> without global connectivity. (Cronin
> <u>Doing More Business. . . 93</u>).

In the semiconductor industry, competition is a
way of life. Staying at the top requires constant
product improvement, as successive generations of
computing await the powerful new chip designs that will
take complex applications in stride. Intel recognizes
that its leadership and profit margins depend upon the
quality of its research, noting in its 1992 Annual
Report that "Intel's competitive position has developed
to a large extent because of its emphasis on research
and development" (Intel 1992).

With an expenditure of $779 million for research
and development in 1992, and more than 5,000 employees
devoted to research and development around the world,
Intel engages in a large number of joint development
projects to ensure its competitive position in the
years to come. Support for this research collaboration

comes in part from the company's Internet connections (Cronin <u>Doing Business on</u>. . . 167).

Intel is a member of the ten-year-old SRC (Semiconductor Research Corporation), which plays a key role in supporting silicon-based technology research at universities and encouraging interindustry cooperation. "The only place research into silicon-based technology is increasing is in our universities, and that is because of SRC," says SRC president, George Sumney. "Plus, we now have the strongest link between industry and the universities that exists anywhere in the world" (Burrows 47).

Shelly Meyer of the University of America In Bulgaria (shelly@nws.aubf.bg) explained her dependency on the Internet. She says,

> Bulgaria is a very undeveloped country. The University of America is taught by American teachers in an effort to share the successes and experiences that Americans enjoy daily to ultimately help Bulgarians reach their potential. When I arrived in Bulgaria a year ago to teach International Marketing I was shocked at how unprepared I was to teach. In order to accomplish my objectives I had to find the proper books to use for my class. I was only able to accomplish this through the Internet. When I located exactly what

books I needed I had them shipped to
Washington D.C. where there is
occasional travel to and from Bulgaria
by our teachers. It was easy to get
someone to package up my order and ship
it with their luggage. Within a few
days I had the books I needed. This
particular situation would have taken
months to accomplish if I had had to
write to publishers in the states.
First, I would have had to get a list of
books available, and then I would have
had to order them. Since the mail is so
unpredictable, it is possible that my
book order would not have arrived until
after the first semester.

The biggest drawback for all the
American teachers is homesickness. The
Internet makes it possible to write to
our families at any time. Without the
Internet and its easy access to loved
ones, many of the teachers would abandon
their posts and head for the states. If
Internet would go away tomorrow, I know
I would personally experience immediate
panic (Meyer).

Taking the mystery out of Internet resources--

sifting through oceans of networked oysters to discover

the pearls of essential information--requires a special

set of skills and expertise. In many companies

corporate information centers have taken responsibility

for exploring the Internet and delivering the most

important resources in a more digestible form through

the company's local network. In the process, such

Taking the mystery out of Internet resources--
sifting through oceans of networked oysters to discover
the pearls of essential information--requires a special
set of skills and expertise. In many companies
corporate information centers have taken responsibility
for exploring the Internet and delivering the most
important resources in a more digestible form through
the company's local network. In the process, such
centers have redefined and expanded the role of the
corporate library, making it more of a partner in
research and development.

Marian Bremer, formerly manager of the library and
now manager of Internet Training Services at Bolt,
Beranek and Newman (BBN), is continually seeking new
ways to bring the resources of the Internet into the
corporate and research environment. Her definition of
library services includes monitoring the Internet and
disseminating strategic information to individuals and
departments where it will be of interest, sometimes
even before they are aware it exists. She feels that
the library will have an increased role in locating and
evaluating networked information when user interfaces

centers have redefined and expanded the role of the corporate library, making it more of a partner in research and development.

Marian Bremer, formerly manager of the library and now manager of Internet Training Services at Bolt, Beranek and Newman (BBN), is continually seeking new ways to bring the resources of the Internet into the corporate and research environment. Her definition of library services includes monitoring the Internet and disseminating strategic information to individuals and departments where it will be of interest, sometimes even before they are aware it exists. She feels that the library will have an increased role in locating and evaluating networked information when user interfaces improve enough to encourage the casual searcher. She states,

> The Internet is changing our job totally; librarians will end up being teachers as well as information specialists. As the Internet becomes easier to use, researchers may think that it provides all the data they need. But because of its distributed organization, Internet data varies a lot in quality and comprehensiveness. Researchers who venture just a little outside of their field can be misled. For example, I've received messages from

scientists who have concluded that there may be a market for a new product or service based on a few hours of Internet browsing. Despite its size, the Internet provides just a fraction of the information necessary to make that kind of decision! Librarians must help their organizations to use it, and to understand how it fits in with other resources (Cronin <u>Doing More Business</u>. . . 175).

The largest problem people face when first using a network is grasping all that is available. Even seasoned users find themselves surprised when they discover a new service or feature that they would never have known even existed. Once acquainted with the terminology and sufficiently comfortable with making occasional mistakes, the learning process will drastically speed up.

Getting where the user wants to go can often be one of the more difficult aspects of using networks. The variety of ways that places are named will probably leave a blank stare on the user's face at first. There is a method to this apparent madness (Kehoe 1).

If someone were to ask for a home address, they would probably expect a street, apartment, city, state, and zip code. That is all the information the post

office needs to deliver mail in a reasonably speedy
fashion. Likewise, computer addresses have a structure
to them.

The user portion is usually the person's account
name on the system, though it does not have to be.
Domain tells you the name of a system or location, and
what kind of organization it is. The trailing domain
is often one of the following:

com Usually a company or other commercial institution
or organization, like Convex Computers
(**'convex.com'**).

edu An educational institution, e.g., New York
University, named **'nyu.edu'**.

gov A government site; for example, NASA is
nasa.gov'.

mil A military site, like the Air Force (**'af.mil'**).

net Gateways and other administrative hosts for a
network (it does not mean all of the hosts in a
network). **'nic.near.net'** and **nic.eu.net'** are
examples of these kinds of gateways.

org This is a domain reserved for private
organizations, who do not comfortably fit in the
other classes of domains. One example is the
Electronic Frontier Foundation named **'eff.org'**.

Each individual country also has its own top-level
domain. For example, the **us** domain includes each of the
fifty states (but is usually only used for small
sites). Other countries represented with domains
include:

au Australia

ca Canada

fr France

uk The United Kingdom. These also have sub-domains
of things like **'ac.uk'** for academic sites and
'co.uk' for commercial ones (Kehoe 2).

Every single machine on the Internet has a unique
address, called its Internet number or IP Address. It
is actually a 32-bit number, but is most commonly
represented as four numbers joined by periods like,
247.22.355.129. This is sometimes also called a dotted
quad; there are literally thousands of different
possible dotted quads. The ARPnet (the mother to

today's Internet) originally only had the capacity to have up to 256 systems on it because of the way each system was addressed. In the early eighties, it became clear that things would fast outgrow such a small limit; the 32-bit addressing method was born, freeing thousands of host numbers. However, there is a growing concern that there may be a shortfall of addresses by the end of the twentieth century (Kehoe 3).

Each piece of an Internet address (like 192) is called an "octet," representing one of four sets of eight bits. The first two or three pieces (say 192.55.239) represent the network that a system is on, called subnet. For example, all of the computers for Wesleyan University are in the subnet 129.133. They can have numbers like 129.122.10.10, 129.122.120.19, up to 65 thousand possible combinations (possible computers).

IP addresses and domain names are not assigned arbitrarily--that would lead to unbelievable confusion. An application must be filed with the DDN Network Information Center (NIC), either electronically, or via regular mail (Kehoe 3).

Since electronic mail is the number one use of the Internet and is rapidly becoming the dominant form of business communication, it is necessary to promote e-mail addresses in all business documents. It is as important as a telephone or fax number. The Internet mail system not only includes all the millions of Internet users, but also includes virtually every commercial network, including CompuServe, America Online, Delphi, MCI Mail, and others. Tapping into the Internet's e-mail system is a must for establishing a presence on the Internet for any business (Angell 75).

Chapter IV
RESULTS

Society thrives on information. Now more than ever, moving vast amounts of information quickly across great distances is one of the most pressing needs. From small one-person entrepreneurial efforts, to the largest of corporations, more and more professional people are discovering that the only way to be successful in the '90s and beyond is to realize that technology is advancing at a rapid pace--and they must somehow keep up. Likewise, researchers from all corners of the earth are finding that their work thrives in a networked environment. Immediate access to the work of colleagues and a "virtual" library of millions of volumes and thousands of papers affords them the ability to incorporate a body of knowledge which was unthinkable before the information age. Work groups can now conduct interactive conferences with each other, paying no attention to physical location--the possibilities are endless.

100

As a result of all this technology users have at their fingertips the ability to talk in "real-time" with someone in Japan, send a 2,000-word short story to a group of people who will critique it for the sheer pleasure of doing so, see if a Macintosh sitting in a lab in Canada is turned on, and find out if someone happens to be sitting in front of their computer (logged on) in Australia, all inside of thirty minutes. No airline could ever match that travel itinerary.

Internet's Impact

Companies already linked to the Internet receive the advantages of high-speed telecommunications and continuously evolving technology while learning invaluable lessons about the management of networked organizations. There are many lessons to be learned. Society is just beginning to understand the impact of networked communication and that it is a way of doing business. A networked society operates on different standards of speed and access to information. As more individuals and organizations connect to international networks, they are coming to expect an enhanced level

of performance from service and information providers.

A customer who is use to instant response time around the globe is no longer willing to wait days or even hours for a query to be acknowledged. Tomorrow becomes too late to find the answer or deliver the product: if one company cannot meet these expectations, a competitor with a network connection will be happy to oblige.

Internet's Evolement

Paul Saffo, a Fellow at the Institute for the Future in Menlo Park, predicts the Internet and other networks will totally redefine today's corporation within a few decades. Internally, Saffo observes, the traditional corporate hierarchy will have to evolve into a more flexible organization that emphasizes teamwork, collaboration with business partners, and distributed decision-making. This in turn will require more active participation by technically sophisticated, highly motivated employees at all levels of the organization (Wylie 93).

Internet's International Capabilities

The organization changes spurred by technology are converging with a transformation in the geographic boundaries of business. The emergency of a global economy means that developments in Asia and South America are just as important in Washington, D.C. Customers half way around the world may constitute the next big growth opportunity for any business. Whether the customer lives in Australia, Brazil, or China, the company needs to find a way to be there, too. The extensive marketing, sales, and customer support networks of multinational corporations are beyond the reach of most businesses eager to expand to a global marketplace. Connecting to the Internet creates an international presence for even the smallest company, allowing communication, data exchange, and support services to flow electronically at no incremental cost. Large corporations find that an Internet connection compares very favorably in cost and performance to dedicated leased lines for long-distance customer support or communicating with a small branch office on the other side of the world. In the continuing search

for competitive advantage, the international
capabilities offered by an Internet connection have
become a vital tool (Cronin <u>Doing Business on</u>. . . 8).

Along with globalization, businesses face the
challenge of keeping up with the rapid pace of
technological change. With premium on working smarter,
innovating faster, and reaching farther than the
competition, corporate investment in technology is
being scrutinized more closely than ever to ensure
benefits commensurate with costs. Every company relies
on an array of technology to conduct its operations
effectively. Software programs are needed for word
processing, accounting, personnel management, inventory
control, networking, computer management,
communications, and graphics--and they will seldom
integrate seamlessly. Whatever their business,
companies must deal with an eclectic mix of hardware
and software technologies that are upgraded or replaced
frequently, and often need minor "tweaking" to perform
at optimal levels. This combination of diverse systems
and rapid-fire changes is difficult to manage. One
systems manager at a medium-size high-tech firm

acknowledged, "We just are not big enough to have someone dedicated to keeping track of every piece of hardware and software. We have to get outside help to solve certain kinds of problems." The Internet, he concluded, "provides us with a real safety net" (Cronin Doing Business on. . . 9).

Internet Connects Questions with Answers

It impossible for most companies to have in-house experts for all the automated systems in place. Through the Internet, people with answers are easy to locate. Someone in another company using the same system may have the perfect solution to a vexing problem. Even better, the product support and engineering experts at the vendor are frequently Internet users who can send an answer directly through the network. Popular hardware and software platforms have generated their own Internet discussion groups where problems, bugs, and new releases are diagnosed and discussed in great detail. Often, lists of frequently asked questions and answers, covering the most common types of problems, are compiled and made

available for everyone to consult. At the same time, attention to the needs of the customer and the quality of all aspects of customer interaction is recognized as an important contributor to corporate success. The Internet can also help in forging closer ties to customers. "Put the customer first," is the message at the heart of many fashionable management theories, but employees who are already coping with substantial demands in their daily work need motivation and resources to keep focused on customer satisfaction. One of the most effective motivators is direct contact with customers. When employees work more closely with the people who purchase their company's products and services, they work harder to provide excellent services in the first place. If something does go wrong, they take more responsibility for solving the problem. The Internet's many discussion and user groups provide an unparalleled opportunity to familiarize employees with the needs of customers on a regular basis, and to give them customer feedback about how products are received (Cronin <u>Doing Business on</u>. . . 10).

The atmosphere of information sharing and consultation fostered by Internet access also encourages employees to seek answers on their own. So many resources are available to solve problems, even relatively small ones, that there is less excuse for letting things go or passing them along to someone else. Most people find it gratifying to receive attention and positive reinforcement for sharing their expertise, so questions posted on Internet discussion groups typically attract multiple responses. The network establishes a new peer group that exists solely to share information and solve problems--"a virtual team" that can be a powerful demonstration of cooperative problem-solving. Seeing the world from the customer's point of view and learning to take individual responsibility for resolving problems with the company's product can become a conscious part of the company culture for improving customer service over the network (Cronin <u>Doing Business on</u>. . . 10).

The current popularity of "reengineering," or fundamentally restructuring, the work process within a company to dramatically increase speed, efficiency, and

cost-effectiveness demonstrates that many managers recognize the imperative of change. But even the strongest proponents of reengineering admit that the majority of such efforts fail to achieve the desired results (Hammer and Champy 14).

Reorganization is a difficult concept to sell to staff, and radical work-flow changes are notoriously hard to implement, particularly when the basis of change is critical of existing work patterns and assumptions (Cronin Doing Business on. . . 11).

Internet use can give employees a broader context for thinking about organizational change, and can promote openness to new approaches to work. Regular Internet users spontaneously suggest new approaches to their work because of what they have learned through the network. A networked environment encourages employees to take the initiative, by gathering information, consulting with experts, and solving problems collaboratively. It transcends the traditional barriers of departments, management hierarchies, and even company boundaries (Cronin Doing Business on. . . 11).

Management analysts have suggested that businesses must evolve into "virtual corporations" or groupings of separate enterprises linked through high-speed networks. As more companies link up with business partners to collaborate on a particular project or to produce and market a product jointly, the virtual corporation will become the norm. Virtual corporations, as a product of the age of connectivity, need direct, reliable communication links to develop and prosper (Davidow and Malone 23).

Web-site customers spend an average of $250 an order with Warehouse Wines & Liquors Corp. instead of the $40 they use to spend when they visited the warehouse. Michael Berkoff, president, is able to keep his deep-discount pricing intact month after month because of his new inventory system which allows him to log exact inventory at any given time. The Web has been pulling in wine enthusiasts from all corners of Warehouse's tri-state territory - New York, New Jersey, and Connecticut - and orders have come in from as far away as Tokyo. All this even though Berkoff began including Warehouse's Web address in his print ads only

last July and has been offering only a limited selection of his total inventory on-line. Berkoff has been able to increase his inventory turns from six to eight times a year and boost profits by 20% (Marx 53).

Amy's Ice Cream Company was able to keep the company prospering from Amy's home while she was on maternity leave. She was able to secure a $450,000 loan from the Small Business Administration just by completing all the forms via information drawn from networked databases connected to her office. Had she not had this capability these forms would not have been completed for another eight months when she returned to work. Amy's Ice Cream Company took advantage of the Internet technology and it made a huge difference in the company's success (Miller 94).

Lewis Fuller, President of Fuller Medical, subscribed to a CD-ROM hook-up system which allowed them to research vendors for very specific equipment. Fuller was able to locate a specialized pediatric walker, an item one of his patients needed immediately. With the system he would have had to make dozens of phone calls, with no guarantee of finding the item.

With the Internet Fuller can often track down items in
less than 30 minutes (Fuller 94).

Patrick McDonnell, CEO of Spectrum Diagnostix,
Inc., counts on the Internet to communicate with
customers all of the world. Spectrum can compete with
big businesses now more than ever. Spectrum can put
together a home page on the World Wide Web and compete
with the high-powered companies. It is no longer a
matter of big versus little, it is a matter of know
how. It is a lack of brains, not brawn, that poses the
real threat for small businesses. U.S. Secretary of
Labor Robert Reich claims that the biggest handicap for
small businesses that are trying to compete is not
revenues or global reach but a shortage of people
trained in using the Internet. McDonnell's ability to
use the Internet allowed him to access databases to get
basic research-and-development information necessary to
maintain performance capabilities by modifying features
in the emissions-monitoring instruments (McDonnell 92).

Jordan Ayan, president of Create-IT, Inc., gains
his credibility by researching information on the
Internet. The Internet has the most up-to-date

information and is reliable. He can impress his clients with data about their own company that has not filtered through the organization yet. Small businesses used to be information poor, but that is no longer the case. Before the Internet wave, small business people were consumed by the day-to-day aspects of running a business, and doing research was difficult. It usually meant making trips to the library or hiring someone to do it. Now the information is at everyone's fingertips (Ayan 96).

Karlyn Wolf Gibbens, author of a self-published book called Marrying Smart: A Practical Guide of Attracking Your Mate, sold more than 3,000 copies of her eleven dollar book within a matter of months, for a gross earning of more than $30,000! Imagine how many more books she could have sold by going onto the global Internet, or even by duplicating her efforts on other on-line services like Compressive and Prodigy. Gibbens proved that if the product is of genuine interest, thousands of dollars can be made (Canter 111).

Parry Lopez and Monical Bosserman Lopez success-fully marketed their hot sauces and foods on the Web.

The payback has been quick. The 1,000 plus daily
visitors who drop by Hot Hot Hot's site generate 20% of
the retailer's total sales -- now up to $300,000 a year
and tend to buy the more profitable gift packs. The
shop processes about ten on-line orders a day; usually
one is from overseas. People come into the 300 square
foot storefront because of the site (Hise 83).

Price Comparison

    The following compares the Internet with marketing
costs for other standard types of media. Table 1
reviews a cost comparison between the Internet and
Television marketing.

Table 1

Internet Vs. Television

Media Buy	Cost	You Get
#1 Rated Daytime Soap National Ad	$45,000 $20.24 cpm*	30-second national spot reaching 4.4 mil households.
Prime Time TV Show ''Seinfeld'' Local Ad	$6,000 $45.55 cpm	30-second local spot reaching 282,000 adults
Prime Time TV show ``Seinfeld'' Local AD	$4,200 $59.57 cpm	15-second local sport reaching 282,000 adults
Prime Time Sunday or Monday Movie Local Ad	$2,500 $26.32 cpm	30-second local spot reaching 190,000 adults
Prime Time Sunday or Monday Movie Local Ad	$1,750 36.84 cpm	15-second local spot reaching 190,000 adults
Friday Night Prime ``Eyewitness Video'' Local Ad	$1,000 $22.99 cpm	30-second local sport reaching 87,000 adults
Late Night ``Letterman Show'' Local Ad	$600 $16.22 cpm	30-second local spot reaching 74,000 adults
Internet Advertising	$1,000 per month $.0333 cptcm**	Leased 56-K line Full Internet access and reaching 30 million computers users.

*cost per thousand per minute
**cost per thousand users per month (Canter 36)

SOURCE: Canter, Laurence and Siegel, Martha. <u>How to Make a Fortune on the Information Superhighway.</u> New York: Harper Collins Publishers, Inc. (1994).

The least expensive price to reach 1,000 people

only one time is $16 on television (Canter 45). It

only costs 3.3 cents to reach 1,000 Netters for a solid
month. All it takes is a product and a little talent
to write a simple description of the product.

Table 2 reviews a cost comparison between the
Internet and radio marketing.

Table 2

Internet Vs. Radio

Media Buy	Cost	You Get
KTAR Local Ad Phoenix, AZ Mon-Fri AM Drive Time	$282 $15 cpm*	60-second local spot 19,300 listeners age 25+
KTAR Midday Local Ad Phoenix, AZ	$150 $11.24 cpm	60-second local spot 13,340 listeners age 25+
KTAR Evening Local Ad Phoenix, AZ	$60 $10.17 cpm	60-second local spot 5,900 listeners age 25+
KVRY Local Ad Phoenix, AZ Mon-Fri AM Drive Time	$350 $36.63 cpm	60-second local spot 9,300 listeners age 25-50
KVRY Midday Local Ad Phoenix, AZ	$400 $29.07 cpm	60-second local spot 13,700 listeners age 25-54
KVRY Evening Local ad Phoenix, AZ	$100 $34.25 cpm	60-second local spot 2,920 listeners age 25-54
KFYI Talk Radio Local ad Phoenix, AZ AM	$205 $22.28 cpm	60-second local spot net reach 9,200 listeners
KFYI Talk Radio Local ad Phoenix, AZ/noon	$145 $7.75 cpm	60-second spot net reach 18,700 listeners
KFYI ``Rush Limbaugh'' Local Ad/Phoenix, AZ	$475 $19.87 cpm	60-second local spot net reach 23,900 listeners
Internet Advertising	$1,000 per/ mo. $.0333 cptcm**	Leased 56-K line Full Internet access reaching 30 million computer users.

*cost per thousand per minute
**cost per thousand users per month (Canter 37).

SOURCE: Canter, Laurence and Siegel, Martha. How to
Make a Fortune on the Information Superhighway. New
York: Harper Collins Publishers, Inc. (1994).

The least expensive price to reach 1,000 people

only one time is $7 on the radio (Canter 45). With a

little imagination users can produce artwork or clever

selling copy that creates the perfect home page to

advertise that special product via the Internet.

Table 3 reviews a cost comparison between the

Internet and newspaper marketing.

Table 3

Internet vs. Newspaper

Media Buy	Cost	You Get
The New York Times Mon-Sat	$440/CI* open rate $49.73 cpm	1,141,366 circulation
The New York Times Sunday	$528/CI open rate, $38.77 cpm	1,756,635 circulation
Los Angeles Times Daily	$502.23/CI open rate,$53.48 cpm	1,211,484 circulation
Los Angeles Times Sunday	$619.50/CI open rate,$54.39 cpm	1,469,202 circulation
Internet Advertising	$1,000 per month $.0333 cptcm**	Leased 56-K line Full Internet access reaching 30 million computer users.

*cost per column inch
**cost per page per 1000 readers(Canter 38)

SOURCE: Canter, Laurence and Siegel, Martha. How to
Make a Fortune on the Information Superhighway. New
York: Harper Collins Publishers, Inc. (1994).

The least expensive price to reach 1,000 people

only one time is $31 in a big city newspaper (Canter

45). With the Net your hands do not get dirty when

reading advertisements.

Table 4 reviews a cost comparison between the

Internet and magazine marketing.

Table 4

Internet Vs. Magazines

Media Buy	Cost	You Get
People Magazine	$83,000 $24.09 cpm*	1 page 3,445,569 circulation
People Magazine	$53,000 $30.75 cpm	1/2 page 3,445,569 circulation
Time Magazine	$101,000 $24.61 cpm	1 page 4,103,722 circulation
Time Magazine	$60,600 $29.53 cpm	1/2 page 4,103,722 circulation
TV Guide	107,600 $7.62 cpm	1 page 14,122,915 circulation
Internet Advertising	$1,000 per month $.0333 cptcm**	Leased 56-K line Full Internet access reaching 30 million computer users.

*cost per thousand users per month
**cost per thousand (Canter 39)

SOURCE: Canter, Laurence and Siegel, Martha. <u>How to</u>
<u>Make a Fortune on the Information Superhighway.</u> New
York: Harper Collins Publishers, Inc. (1994).

The least expensive price to reach 1,000 people
only one time is $7 in a national magazine (Canter 45).
Although this is very inexpensive the advertising
reaches its audience only for a brief moment, whereas
the Internet is on-going.

Table 5 reviews a cost comparison between the
Internet and direct mail marketing.

Table 5

Internet Advertising vs. Direct Mail

Media Buy	Cost	You Get
Direct Mail	$330	1,000 brochures mailed to customers
(Assuming printing cost of $0.15 each. Assuming bulk mailing cost of $0.18 each)	330 cpm**	
Internet Advertising	$1,000 per month $.0333 cptcm**	Leased 56-K line Full Internet access reaching 30 million computer users.

*cost per thousand users per month
**cost per thousand (Canter 40).

SOURCE: Canter, Laurence and Siegel, Martha. <u>How to</u>
<u>Make a Fortune on the Information Superhighway.</u> New
York: Harper Collins Publishers, Inc. (1994).

The least expensive price to reach 1,000 people
only one time is a whopping $330 using direct mail
(Canter 45). While users may not have the cash to be
able to go up against the corporate titans on other
mediums like network TV, the most wonderful part of
cyber-selling is that on the Information Highway, the
playing field is level. The Net disseminates at a low
cost and the various marketing methods available on the
Internet make it very accessible to everybody.

Chapter V

DISCUSSION

Summary

For the first time in history, U.S. companies are spending more on computing and communications equipment than on industrial capital goods. The industrial age has given way to the information area. Computer and communications technology are the new infrastructure of the modern economy. The Internet, which is itself the result of a marriage of global communications and computers, is rapidly becoming the new medium of this information economy. The race is on for virtual commerce on the Internet, which is the conducting of business in cyberspace. Cyberspace is any virtual world provided by any network of computers, including the Internet (Angell 1).

Eventually, interactive computer and television communications may change the way people shop. Already, there are interactive TV trials where users can browse on-screen menus of restaurants or

120

entertainment events and make reservations or order tickets with TV remote control. Futurists envision a time when users will instruct software ``agents'' to do their shopping for them. For example, a user might ask an agent to search all on-line sources for a specific size of refrigerator with certain features. The agent might suggest the model that would best serve the buyer's needs and at the best price and the user might tell the agent to place the order for the one suggested (Levinson 4).

The future of shopping looks incredible. Planning to leverage on-line technologies for a business will mean separating what is possible for today from what might be possible for tomorrow. Market avenues and strategies should stand the test of time (Levinson 5).

Developing a successful corporate strategy for the Internet and the World Wide Web involves more than keeping up with technical developments. The greatest advantage comes from matching Internet capabilities with key opportunities for adding value to the core functions like marketing, sales, customer support, and information management. The way to accomplish this is

to learn from industry leaders--companies like
Motorola, Rockwell, Digital, Intel, and IBM. Their
stories and experiences offer valuable insights for
anyone interested in the future development of the
Internet (Cronin <u>Doing Business on</u>. . . 247).

The Net's potential for commerce is growing by
leaps and bounds. Commercial domains joining the Net
are growing at about ten percent (about 1,500 new
domains) per month. The Worldwide Web now boasts more
than 6 million users, and total Web traffic grew by
1800 percent during 1994. Another sign of growing
commercial activity is Dave Taylor's Internet Mall, a
free service that lists Net-accessible businesses.
During one three-month period in the fall of 1994, the
Mall's listings grew 30 percent every two weeks
(Levinson 42).

To evaluate the economics of Internet-based
marketing, companies should compare the costs of
traditional marketing options. For example, the cost
of placing an advertisement in a magazine should be
compared with the cost of presenting information on-
line. In many cases, using the services of the

Internet as an advertising medium is considerably less expensive and offers more interaction with the customer. However, the biggest cost of Internet marketing is not the cost of presenting the information, but the labor required to dialog with the market. This is because the Internet is not one vast, homogeneous market, but a constellation of different virtual communities. Interactively participating in these virtual communities one by one will help establish a company's Internet business presence and allow successful tapping into the Internet market as a whole (Angell 17).

Disadvantages

Computer networks, however, are not without their disadvantages. Implementation and maintenance of computers do have a price tag. Security and privacy must be maintained. There is always a question of accuracy and reliability. There will always be disparities between individuals and groups with regard to wealth and information access. Employees are usually resistant to change and computer technology is

always changing. Employees are constantly adapting to new equipment because of new technology (Mostafa The Internet Handbook. . . 5).

The physical components of a network can be expensive to purchase, install, and maintain. Information managers must weigh these costs with the value gained in order to determine if a network is necessary or beneficial to solving the problem at hand. This consideration can often be a question of scale. "We need a network, but not a large one." "We need a way to communicate and share information with an office overseas." "We just want to share a printer between offices." These are all examples where scale is the most important factor to consider for network implementation technology (Mostafa The Internet Handbook. . . 6).

All networks face security problems. Because all machines on a network are connected (and certain machines may share storage devices), the potential exists for unauthorized access to sensitive or private information. Network tools exist for system administrators to minimize and manage risk, but risk

cannot ever be completely eliminated. Certain files that may contain privileged information will have to be reserved for use by select individuals. Part of security revolves around privacy related to electronic means of data and information transfer. Procedures must be in place to ensure that network communications reach their intended recipients. Managers must also give thought to the protection of the system from computer viruses.

Information obtained from a network is not necessarily accurate or reliable. Information such as that in distributed databases or research data used exclusively within the bounds of a particular group is only as accurate as that group wants to make it. It is often difficult to gauge the accuracy of data gathered across network ties. The inaccuracies of network information are especially evident in information gathered from electronic forums such as discussion groups or news groups. No institution ensures the reliability of information disseminated through these channels. Thus, users should consider the accuracy of data before making decisions based upon what they have

found technology (Mostafa <u>The Internet Handbook</u>. . .
6).

There are other limitations with the Internet.
The computer systems on the Internet that offer
information and services to the public usually do so on
a voluntary basis. These computer systems usually also
have some other primary reason for being there--as
campus academic and administrative computers, as
corporate computer systems, as research computers, or
as government agency computers. This means that many
systems offer the public resources as a secondary
function of its computer systems. During normal
business hours these systems may be used heavily and
begin to respond to its primary tasks more slowly.
Despite this, most sites do not shut off the Internet
community even during peak hours--but they do request
that people voluntarily limit the number and length of
connections during these peak hours. So far, this
voluntary system has worked quite well, so few system
administrators have had to "pull the plug" on the
Internet community (Ellsworth 58).

In conclusion, in spite of the obvious disadvantages the Internet puts small business on an equal footing with the largest corporations by making it possible to reach 30 million people with the touch of a button. It is the ultimate marketing tool for almost any product or service as shown through this research. Businesses not connected to the Internet or at a great handicap when competing with those that are connected. Therefore, the hypothesis that any growing business needs to invest in the Information Superhighway to remain competitive was supported in this study.

Limitations

There was very little information available at the libraries one year ago when this research began. There was no doubt that it was going to speed up the process of transferring information whenever it was up and running. That part was easy to understand. It was difficult to understand its vastness and its capability when it was in its embryo stage. There were so many roadblocks to overcome to get the Internet going. Just

installing lines from the main terminal to all its tributaries was a monumental task. It needed funders, and then it needed regulations. Then there was the question of how would users get billed on its use, and who would reap the benefits of its economic return.

Today all those questions are resolved and the word ``Internet'' comes up every day at the office. It is even on the news regularly whether it be advertising it or just talking about its latest technology.

There are countless newspaper and magazine articles and books about the Internet. In January of 1995 there were no success stories written because the Internet was too new. Countless trips to the library proved to be unsuccessful when looking for a company that had made money because of advertising on the Internet. Data collected at that time was mostly information about how great it was going to be when everyone was connected to the Internet. A year ago very few of my friends had computers in their homes. Today 95 percent of my friends have computers and they are all talking about getting connected to the

Internet. Forget about going to outerspace - the new buzz word is ''cyberspace.''

Suggestions for Future Research

Future research should include personal interviews with businesses that have connected to Internet discussing events surrounding decision to connect. Discussion should entail what it took to connect, cost, timeframe, and learning curve to all those involved with using the Internet. It would be interesting to see exact figures on balance sheet before and after connecting to see what an impact the Internet really makes.

Research should include attending classes on the Internet and reporting cost and materials covered. Researcher should make recommendations as to which Internet on-line entity provides the best service for the best price.

Works Cited

Angell, David and Heslop, Brent. The Internet Business Companion. Addison-Wesley Publishing Company, 1995.

Ayan, Jordan. ``Create-IT Inc.'' Inc. Technology. 14 Nov. 1995, p. 96.

Branwyn, Gareth. Mosaic Quick Tour. Ventana Press, Inc., 1994.

Burrows, Peter. Consortia: Are they getting better? Electronic Business 18(8): 47-50. May 18. 1992.

Burrus, Daniel and Gittines, Roger. Techno Trends. Harper Collins Publishers, Inc., 1993.

Canter, Laurence and Siegel, Martha. How to Make a Fortune on the Information Superhighway. New York: Harper Collins Publishers, Inc., 1994.

Case, Tony. "Fax, CD-ROM, On-line Services and Newspapers." Editor & Publishers Jul. 16, 1994: 12.

Comer, Douglas, E. The Internet Book. Prentice-Hall, Inc., 1995.

Cronin, Mary J. Doing Business on the Internet. International Thomson Publishing Company, 1994.

---. Doing More Business on the Internet. International Thomson Publishing Company, 1995.

Crowe, Elizabeth Powell. The Electronic Traveler. Windcrest/McGraw-Hill, 1994.

Davidow, William H. and Michael S. Malone. The Virtual Corporation. New York: Harper Collins, 1992.

Eddings, Joshua. How the Internet Works. Ziff-Davis Press, 1994.

Ellsworth, Jill H. and Ellsworth, Matthew V. The Internet Business Book. John Wiley & Sons, 1994.

Engst, Adam C. Internet Starter Kit. Hayden Books, 1994.

Epstein, Lawrence. Career. The Rosen Publishing Group, Inc., 1990.

Estrada, Susan. Connecting to the Internet. O'Reilly & Associates, 1993.

Fisher, Sharon. ``Just Who Owns the Internet?'' InfoWorld Feb 4, 1991.

Foster, Ed. "Survey Says Companies Moving to Client/Server to Boost Profits." Infoworld Sep. 19, 1994: 54.

Fuller, Lewis. Fuller Medical. Inc. Technology 14 Nov. 1995, p. 94.

Glossbrenner, Alfred. Internet 101. McGraw Hill, Inc., 1995.

Hammer, Michael, and James Champy. Reengineering the Corporation. New York: Harper Business, 1993.

Hardie, Edward T. L., Neou, Vivian. Internet: Mailing List., PTR Prentice-Hall, 1994.

Hertz, J. C. Surfing on the Internet. Little, Brown & Company, 1995.

Hise, Phaedra. ``The Well-Merchandised Web Site.'' Inc. Technology Oct 1995, p. 83.

Hogan, Mike. ``Plan to Retire with Confidence.'' PC Computing Jul, 1955: 77.

Intel Corporation. Annual Report. Santa Clara, California, 1992.

Kee, Eddie. Networking Illustrated. Que Corporation, 1994.

Kehoe, Brendan P. Zen and the Art of the Internet. PTR Prentice-Hall, Inc., 1993.

Levinson, Jay Conrad. Guerilla Marketing. New York: Houghton Mifflin Company, 1995.

Lewis, Peter H. Library of Congress Offering to Feed Data Superhighway. The New York Times Sep 12, 1994: v143 pB1(N).

Lynch, Daniel and Rose, Marshall. Internet System Handbook. Addison-Wesley Publishing Company, Inc., 1993.

Madron, Thomas W. Local Area Networks. John Wiley & Sons, Inc., 1988.

Marx Wendy. ``Quicker Liquor,'' Inc. Technology 14 Nov. 1995, p. 54-55.

McDonnell, Patrick. ``Spectrum Diagnostix, Inc.,'' Inc. Technology 14 Nov. 1995, p. 92.

McMullen, Melanie. Network Remote Access. Miller Freeman, Inc., 1994.

Metcalfe, Robert. "Iway frenzy reaches summit: is the next phase all Downhill?" Infoworld Oct. 17, 1994: 64.

---. "Readers ponder Iway: if you build it, we will come?" Infoworld Sep. 29, 1994: 72.

---. ``Here's How to Take Client/Server Software for Spin on the Iway,'' Infoworld Sep. 19, 1994: 54.

Meyer, Shelly. Internet Interview. Sep. 1995.

Miller, Amy. ``Amy's Ice Cream,'' Inc. Technology 14
     Nov. 1995, p. 94.

Miller, Michael. Easy Internet. Que Corporation,
     1994.

Mostafa, Javed, Thomas Newell, and Richard Trenthem.
     The Easy Internet Handbook. Colorado: Hi Willow
     Research & Publishing, 1994.

---. The Internet Handbook. Colorado: Hi Willow
     Research & Publishing, 1994.

Ogden, Michael, R. "Politics in a Parallel Universe:
     Is There a Future for Cyberdemocracy?" Futures
     Sep. 1994: 713.

Penzias, Arno. Ideas and Information. W. W. Norton &
     Company, 1989, 12-15.

Pike, Mary Ann. Using Mosaic. Que Corporation, 1994.

Piller, Charles, "Dreamnet: Consumers Want more than TV
     Overload from the Information Superhighway. But
     will they get it?" Macworld Oct 1994: 96.

Resnick, Rosalind and Taylor, Dave. The Internet
     Business Guide. Sams Publishing, 1994.

Rorabaugh, Britt. Data Communications and Local Area
     Networking Handbook. Tab Books, Inc., 1985.

Roszak, Theodore. The Cult of Information. Pantheon
     Books, 1986.

Rutton, Peter. Netguide. Michael Wolff & Company,
     Inc., 1994.

Seiter, Charles. The Internet for MACS for Dummies.
     IBG Books Worldwide, Inc., 1994.

Smith, Richard. Navigating the Internet. Prentice
     Hall Computer Publishing, 1993.

Stair, Lila B. Careers in Computers. NTC Publishing
     Group, 1991.

Stewart, Thomas, "The Information Age in Charts,"
     Fortune Apr 4, 1994: 75.

Taylor, Gerald. "A View from the Top,'' Wireless.
     Nov./Dec. 1994.

Veljkov, Marks. Pocket Guides to the Internet Volume
     4. Mecklermedia, 1994.

Wiggins, Richard W. The Internet for Everyone.
     McGraw-Hill, Inc., 1995.

Wylie, Margie. "Will networks kill the corporation?''
     Network World 10 (2) Supplement: 9-12.