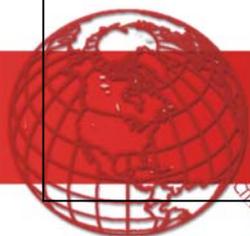


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## Introduction

Every community will have a wake-up call in the New Economy. It might be the loss of a key business, stagnating income growth, a workforce that can't support New Economy businesses, or not being able to maintain a competitive advantage in economic development. Communities respond in differing ways to the challenge of creating a competitive advantage in the dynamic economy in which we live. Most communities respond by doing nothing, not fully understanding a fundamental change has occurred; some begin to address the issues in an uncoordinated and haphazard way – producing some results but not creating substantive change; and, fewer still adopt wholly new approaches using a collaborative approach involving the community's key economic sector groups.<sup>1</sup>

Lincoln's wake-up came when the Gallup Organization announced it would expand its operations to nearby Omaha due to perceived weaknesses in the City's "economic infrastructure".<sup>2</sup> One of Gallup's concerns with Lincoln is a perception that its telecommunications infrastructure would not meet its growing and increasingly complex requirements. Gallup has been a Lincoln-based business for many years and one of the top employers in the community; expanding elsewhere has a significant impact and got the attention of the community.

In response to this wake-up call, the Mayor of Lincoln formed the Technology Council, a broad based group designed to help the community identify what changes have to be made to compete in the New Economy. The Technology Council has come together to begin exploring the significant issues surrounding Lincoln's desire to retain a competitive advantage and create long-term economic successes. The Technology Council has brought together a diverse group of individuals to evaluate and debate the issues. The basic goal of the Technology Council is to identify and address the attendant challenges of being a successful community in the New Economy.

The Technology Council issued an initial report that outlines the immediate challenges for Lincoln. The Lincoln Journal Star<sup>3</sup> summarized this report as follows:

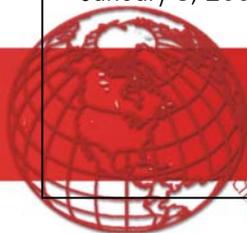
*Lincoln and the region need champions and angels -- and not the running, sweating or flying kind, but visionaries and financiers willing to lead new alliances to promote local economic growth in selected fields..."*

Sounding a direct warning against what it suggests could be a sense of local complacency, its report argues a lot of work needs to be done to create systems,

<sup>1</sup> Economic sector groups are: business, government, health care, education, non-profits, telecommunications, etc. The term economic sector group is used frequently in this report.

<sup>2</sup> Telecommunications system, airport, and access to venture/angel capital.

<sup>3</sup> January 8, 2001



structures, financing and leadership to make Lincoln and its surrounding region competitive in this century's new economy.<sup>4</sup>

One of the challenges noted by the Technology Council is the need to understand how the City's telecommunications infrastructure plays a role in being able to retain, build, and attract technology-based businesses to Lincoln. Advanced telecommunications networks are a key enabling asset of a community that helps them compete in the New Economy. Gallup's decision helped create uncertainty about Lincoln's telecommunications infrastructure being able to support long-term economic success of New Economy businesses.

To learn more about the City's telecommunications infrastructure and its relationship to economic development and a healthy community, the Technology Council and City of Lincoln hired HDR Management Consulting Group to help it assess the City's telecommunications infrastructure, its usage by the community, and to make recommendations for how to make the community more competitive for technology related businesses.

The following report summarizes HDR's work for the Lincoln community.

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<sup>4</sup> Lincoln Journal Star, 1/8/02



## Glossary of Terms

**Analog Mobile Wireless:**

Voice and data services that are transmitted over networks using analog protocols to people using wireless devices that do not require staying at a fixed location.

**Bandwidth:**

The capacity of a transmission channel to move data among locations.

**Cable:**

Cable TV network comprised of fiber and/or coaxial cable. Modern cable networks can use cable modems to enable two-way high-speed Internet access.

**Connectedness:**

The measure of how well connected to the Internet a person is.

**DSL:**

Digital Subscriber Line service provides high speed Internet access over traditional copper telephone infrastructure and is usually available only to locations within 18,000 wire feet of a local exchange carrier's central office.

**Dial-up Internet access:**

Obtaining connectivity to the Internet by using a modem and standard telephone line to connect to an Internet Service Provider or other provider of Internet service. Maximum access speed is 56kbps.

**Digital Signature:**

An authentication process using encryption to ensure that a communication that has been received has not been tampered with.

**Firewalls:**

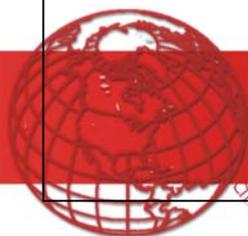
A software process for protecting undesired access to a network or access device.

**Fixed Wireless:**

Service that is provided wirelessly to a device that is located in a single place and not mobile.

**High-speed Access:**

Access to the Internet at transmission speeds greater than 128kbps.



**Informational Websites:**

Websites that only present information and do not allow for any interactivity or transactions.

**Interactive Websites:**

Websites that enable real-time communication and/or transactions between the user and the website.

**ISP:**

Internet Service Provider. A company or organization that provides a user with a connection to the Internet.

**Kbps:**

Kilo bits per second. A measurement of the rate of speed that data is being transferred. 1Kbps equals 1,000 bits per second.

**Mobile Digital Wireless:**

Voice and data services that are transmitted over networks using digital protocols to people using wireless devices that do not require staying at a fixed location.

**Network Infrastructure:**

The physical plant of wires, switches, routers, hubs, satellites, broadcast towers, dishes, and other hardware that allow communications signals to be delivered across networks.

**Portal:**

A website that aggregates content and provides a methodology for accessing that content.

**Privacy Policy:**

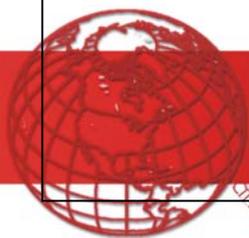
The stated methodology used by a website for handling information collected on users of that website.

**Public ports:**

Publicly available data jacks where people can plug in their access devices to connect to the Internet.

**T1:**

A dedicated connection providing transmission capacity at up to 1.54 Mbps.



**Telecommuting:**

Using networked technologies to perform work-related activities away from the office or business using information and communication technologies.

**Terminals:**

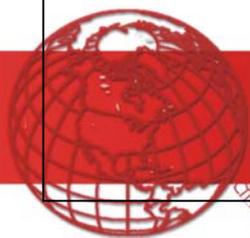
Access devices that enable the user to view web pages and transmit e-mail.

**Transactional Websites:**

Websites that enable the user to order and pay for goods and services online. Digitized goods and services can also be delivered online.

**Virus Software:**

Programs that protect a computer or access device from being infected with software viruses that can destroy and/or alter data, applications, and systems.



## Key Findings and Recommendations

### Key Findings

Three key themes surfaced during this technology assessment of Lincoln, Nebraska. The first is that most of the **essential elements are in place in Lincoln to be successful in the New Economy**. The community has the telecommunications infrastructure and providers to compete – and there is growing competition that will positively impact telecommunications costs and choices. The University is playing an essential role in supporting local economic development in technology based and biotechnology based businesses and has committed to becoming a national leader in research and development. The Technology Center has been successful in incubating businesses and sending them out into the community. Lincoln K-12 schools are producing top quality students helping make Lincoln an attractive place to start or locate a business. Sectors of Lincoln, such as education and healthcare, are utilizing technology in innovative ways and are well positioned to make Lincoln a competitive place to live and do business. And lastly, the City has instituted a Technology Council to expedite Lincoln's movement into the New Economy.

The second significant theme that emerged is **the need for a unified approach to developing and implementing initiatives to make Lincoln competitive in the New Economy**. Currently, there are many individual initiatives underway that on their own produce value to the community, but the lack of overall coordination does not allow Lincoln to fully realize the benefits.

The third theme is that **none of the benchmark communities have a clear competitive advantage over Lincoln**. Individual communities appear to be excelling in specific areas, but not overall. Lincoln has a clear opportunity to develop broad based initiatives such as developing industry clusters in software and electronics, and better integrating University research and development and business formation, enhancing relationships between venture and angel investors and start-up businesses, and developing an overall vision of how technology-based companies can thrive in Lincoln. Additionally, none of the peer communities have a clear competitive advantage in marketing themselves as a destination location for technology-based companies.

The tables in this section summarize the key findings not only within Lincoln, but also among the benchmark cities.

### Summary of Lincoln's New Economy Standing

Participants at the Connecting Lincoln Workshop rated six areas of technological impact: The Network (infrastructure), Networked Places (access), Networked Applications and Services, Networked Economy, Networked World Enablers, and Quality of Life.



The tables on this page and the two pages following provide a summary of Lincoln's standing in each of the six areas according to four stages.

- **Stage 1:** High-speed services are hard to get or expensive; few take advantage of the resources and services on the Internet.
- **Stage 2:** High-speed services are more widely available; local web sites are limited.
- **Stage 3:** General access to high-speed services; web sites support transactions; organizations beginning to restructure for the New Economy.
- **Stage 4:** Universal access to affordable, high-speed services; the Internet has changed the way all organizations operate; the Internet is fully integrated into everyday life.

## The Network

*Current Stage: 3*

Lincoln's telecommunications companies report the broad availability of broadband services. ALLTEL and Time Warner are both providing high-speed services targeted toward residential and business customers. New entrants into the Lincoln market are emerging. In the past year, both ALLTEL and Time Warner have significantly enhanced their investment in Lincoln to provide advanced services. Aquila and Sprint are companies who report they are entering the Lincoln market to focus on serving the needs of business customers. The entrance of new providers to Lincoln will enhance competition and provide redundant network connections for businesses with significant telecommunications requirements.

Continued on the following pages



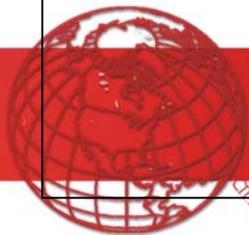
## Networked Places

*Current Stage: 2+*

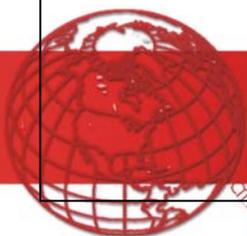
The City of Lincoln School District is highly networked and has contracted for the construction of an even more advanced fiber optic network to link its 59 sites. Higher Education reports having fast connections to each classroom and in dorms. UNL has implemented wireless networking technology on campus and plans to have the entire campus on a wireless system within a year. The Library System provides an essential point of access to free computers and the Internet. Community-Based Organizations are implementing cutting edge programs to strategically utilize technology in their operations.

The City of Lincoln and Lancaster County have developed a highly integrated cooperative information network. This network consists of a total of ninety physical sites. Of these ninety sites, twenty-three are connected via redundant fiber leased from AllTel. The frame relay network leased from AllTel consists of Sixteen T1 connections, thirty 56k connections and twenty additional point-to-point circuits running a combination of 9600 baud up to 56k speeds. In addition, the City and County have established wireless connectivity within the County/ City Building and have also established fixed wireless between four additional sites. The network backbone utilizes a switched gigabit Ethernet topology. Dial in access is also provided to all City/County servers. Approximately 100 users take advantage of this technology via a Winframe Dial-up Server. For those customers wishing to connect to the City/County Network from the Internet, Secure Encrypted Virtual Private Network, (VPN), connections, have been established. These VPN's have been established through the firewall to both full site connections (multiple users), and individual client accounts. The final type of connections that are currently in use provide real time Personal Digital Assistant (PDA), connections to the City/County Network.

Continued on the next page



<p style="text-align: center;"><b><u>Networked Applications &amp; Services</u></b></p> <p style="text-align: center;"><i>Current Stage: 2</i></p>	<p>Organizations in Lincoln are beginning to develop more online service capabilities and fully take advantage of their investments in technology. The Chamber operates a successful jobs portal that is a resource for both job seekers and employers. The City is aggressively pursuing online government or e-government, and plans to have an online payment capability in early 2002. Community-based organizations are developing a portal to provide better information access to each other and to the community at large. The University of Nebraska offers satellite-based, and on-line courses. The Catholic school system is utilizing a real-time website to provide information to parents. Elementary schools within the Lincoln Public School System are offering computer training to community members in their districts. Community-based organizations are providing training and computer/Internet access to the community.</p>
<p style="text-align: center;"><b><u>Networked Economy</u></b></p> <p style="text-align: center;"><i>Current Stage: 3-</i></p>	<p>Lincoln has the assets and programs to promote innovation in the community. The University Technology Park, Prairie Computer project, Great Plains Software Initiative, the JD Edwards program, the NE Center for Entrepreneurs, and participation in Internet 2 provide significant opportunities for businesses to engage in University programs that benefit economic development. Also important is an educated workforce. Lincoln has an educated workforce and there are ongoing programs to help individuals and businesses to maintain the latest skill sets.</p>
<p style="text-align: center;"><b><u>Networked World Enablers</u></b></p> <p style="text-align: center;"><i>Current Stage: 2-</i></p>	<p>Visitors and guests in the community can find high-speed access to the network. Kinko's and the Cornhusker Hotel for example have high-speed Internet access available. Privacy and security are issues of concern that need to be addresses, and organizations need more information on how to address them. The community is just beginning to address key telecommunications and economic development issues.</p>
<p style="text-align: center;"><b><u>Quality of Life</u></b></p> <p style="text-align: center;"><i>Current Stage: 3</i></p>	<p>Lincoln ranked highly in most ratings in the quality of life area. One notable problem area is the lack of direct jet service to major metropolitan regions.</p>

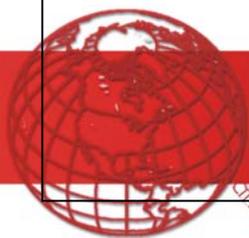


## Benchmark Assessment Findings

In addition to assessing the community of Lincoln, significant economic, and marketing data was collected and analyzed for seven benchmark communities:

- Boise, Idaho
- Boulder, Colorado
- Des Moines, Iowa
- Fort Collins, Colorado
- Kansas City, Missouri
- Madison, Wisconsin.
- Omaha, Nebraska

As the following table illustrates, Lincoln's demographics characteristics are similar to those of the benchmark communities. A notable difference is in the expected rate of job growth; while Lincoln is above the national average, it is well below that of Boise, Boulder, Fort Collins, and Madison. Also of note is that Lincoln appears to have a competitive advantage in average housing prices over its peer communities.



### Demographic Benchmarks<sup>5</sup>

	Lincoln	Boise	Boulder	Des Moines	Ft. Collins	Kansas City, MO	Madison	Omaha
<b>Population</b>								
Population	225,581	185,786	94,673	198,682	118,652	441,545	208,054	390,077
Population Change	12%	24.6%	6.0%	-1.2%	27.6%	0.6%	10.4%	8.1%
Median Age	31.83	32.43	30.53	33.42	29.35	35.33	31.57	35.07
<b>Race</b>								
White	93.3%	95.6%	89.8%	87.4%	91.0%	67.2%	86.3%	82.0%
Black	2.7%	0.7%	2.4%	7.6%	2.4%	28.5%	6.1%	14.4%
Other	7.7%	8.1%	15.2%	5%	16.8%	8.8%	10.6%	3.6%
<b>Professions</b>								
Executive	12.9%	15.5%	14.9%	11.2%	13.1%	12.4%	13.6%	11.9%
Professional	16.4%	16.1%	29.6%	11.7%	23.0%	14.1%	21.8%	14.0%
Technical	4.7%	4.9%	6.8%	3.4%	5.7%	4.0%	7.2%	3.8%
Sales	12.1%	12.1%	12.7%	11.1%	12.3%	10.9%	10.4%	13.5%
<b>Economy</b>								
Income per capita	\$19,841	\$22,035	\$24,678	19,310	\$19,417	\$20,692	\$22,352	\$19,675
Unemployment <sup>6</sup>	3.6%	3.1%	2.3%	1.7%	2.8%	2.8%	1.6%	2.5%
Recent Job Growth	2.2%	5.4%	6.8%	0.6%	1.9%	1.8%	0.6%	1.7%
Future Job Growth	12.7%	47.8%	29.2%	19.7%	26.0%	11.6%	24.3%	9.3%
Cost of Living	96.3	102.4	132.8	94.8	111.7	93.5	107.1	95.3
Median Home Cost	\$107,270	\$128,140	\$219,810	\$100,500	\$163,100	\$81,940	\$137,930	\$113,040
<b>Crime (# of occurrences in 2000)</b>								
Violent Crime	570.5	307.4	201.1	398.3	349.7	1,749.1	307.4	1,238.8
Property Crime	5,705.1	3,410.9	4,041.7	5714.3	4,009.3	9,881.7	4,452.3	5809.4
<b>Education</b>								
High School	86.0%	87.1%	92.5%	82.6%	92.1%	79.7%	88.6%	84.1%
4yr College	21.8%	22.2%	36.1%	16.2%	29.7%	17.9%	27.2%	18.6%
PhD Grads	10%	9%	25%	6.5%	17%	8%	19%	7.6%
School Expenditures	\$5,799	\$4,440	\$4,971	\$5,845	\$4,797	\$6,091	\$7,328	\$5,372
Student/Teacher Ratio	14.8	19.3	19.6	17.1	19.2	16.6	14.3	16.3
<b>Quality of Life Index<sup>7</sup> (Best: 100, Worst: 0)</b>								
Leisure	11	24	43	8	44	28	12	NA
Arts	17	11	16	12	12	33	17	NA

<sup>5</sup> US Census, 2000 [www.factfinder.census.gov](http://www.factfinder.census.gov), [www.bestplaces.net](http://www.bestplaces.net)

<sup>6</sup> The data represented in the table is 1999 Census data. More recently, unemployment in Lincoln was: 2.9 in 12/01, and 3.6 in 2/02

<sup>7</sup> cnnMoney Best Places to Live



This next table provides a comparative look at New Economy characteristics.

### New Economy Health

	Lincoln	Boise	Boulder	Des Moines	Ft. Collins	Kansas City	Madison	Omaha
<b>Benchmark Study</b>								
Apparent public/private collaborative efforts specific to the New Economy	●							●
Venture capital program to match venture capitalists with entrepreneurs		●	●		●	●	●	
Electronic resources for tech-based businesses to start up shop	●	●					●	●
Industry clusters where higher education, government, and economic development are working together								
Clear vision for the future		●			●		●	●
Leveraging University	●		●				●	
Economic development initiatives		●		●		●	●	●
Entrepreneurial environment		●	●				●	
Clearly targeted marketing initiatives towards building the New Economy			●	●				●

Within the peer communities, not one has a clear competitive advantage across the board. Some stand out in specific areas, but a true model for competition in the New Economy isn't among them.

#### Marketing and Organizational Assessment of Benchmark Communities

A critical look at the benchmark communities' organizational and promotional efforts showed that some of the benchmark communities were engaging in innovative ways of encouraging the growth of technology.

#### **Boise**

At the state level, Idaho provided tax initiatives last year that were focused on broadband development.



### Boise Chamber of Commerce<sup>8</sup>

- The Chamber of Commerce web site texturally promotes quality of life indicators under a “Relocation” link. A detailed description of the City of Boise is included.
- The Chamber also sponsors a Small Business Committee devoted to the education and training of small business entities, either existing or start-ups, in Boise.
- The Boise Metro Economic Development Council, also a part of the Chamber of Commerce, sponsors an annual Venture Capital Investors Forum to bring together angel investors and service providers. A copy of their invitation/agenda is provided in Appendix F. A 30-member Venture Capital Committee made up of venture capitalists, entrepreneurs, bankers, government officials, attorneys, CPAs, and service providers, oversees this event and publishes a website listing venture capital firms and other business development contacts in Boise.

### Idaho Small Business Development Center<sup>9</sup>

- This is a non-profit organization in Boise that offers free/low-cost technical consulting research and training in all aspects of small business management. They are operated by a group of paid staff, higher education faculty, private sector professionals, and upper level business students.

### Boulder

#### Boulder Chamber of Commerce<sup>10</sup>

- Throughout the Chamber’s web site, quality of life is heavily promoted through brief facts and statistics. Their slogan, “Boulder: Where Life is Good” is prominently displayed on the front page.
- The Chamber sponsors a Small Business Development Center that is a joint venture between the Chamber and the U.S. Small Business Administration. This Center provides low-cost/free training and access to resources (marketing and growth issues, short and long term goal setting, and financing) to entrepreneurs in the community. Additionally, they provide a portal for high tech business assistance, as well as for forms, licensing, and permitting.

#### Internet Chamber of Commerce<sup>11</sup>

- Both Boulder and Fort Collins belong to the Internet Chamber of Commerce in Colorado. This group jointly sponsors a series of Internet Technology information sessions with the University of Denver. They also post job openings for positions throughout the state.

<sup>8</sup> [www.boisechamber.com](http://www.boisechamber.com)

<sup>9</sup> [www.lcsc.edu/visbdc](http://www.lcsc.edu/visbdc)

<sup>10</sup> [www.boulderchamber.com](http://www.boulderchamber.com)

<sup>11</sup> [www.icc.org](http://www.icc.org)



### City of Boulder<sup>12</sup>

- The City of Boulder ranks #2 on the Digital Cities Survey. This icon and ranking statistic are prominently displayed on the City's homepage. The image serves as a link to the Digital Cities study where more information about Boulder can be found.

### Des Moines

#### City of Des Moines<sup>13</sup>

- Web site provides a tool to reserve city spaces to hold business meetings. These facilities are free of charge.

#### Des Moines Economic Development Council<sup>14</sup>

- This web site is currently under development, but there are plans to post a fiber optic corridor map. Additionally, the site highlights quality of life indicators and business parks.
- Services include: project management, building and site selection assistance, redevelopment, and development financing.

### Ft. Collins

#### Fort Collins Chamber of Commerce<sup>15</sup>

- The Chamber of Commerce in Fort Collins has a special program called "ChamberBiz" that caters to small businesses. It provides online text guides on a thorough range of entrepreneurial subject matters.

#### Internet Chamber of Commerce

- As stated above, both Boulder and Fort Collins belong to the Internet Chamber of Commerce in Colorado. This group jointly sponsors a series of Internet Technology information sessions with the University of Denver. They also post job openings for positions throughout the state.

#### City of Fort Collins<sup>16</sup>

- The City of Fort Collins offers a wide variety of e-services. Their online program, "Ask a City Manager," includes police reports, library catalogs, maps, and job postings. Additionally, they have an online forms section that provides access to every permit, guide, and application for the City; many can be filled out and submitted online, others have to be printed and mailed in.

### Kansas City

#### Greater Kansas City Chamber of Commerce

- The Chamber sponsors the Metropolitan Entrepreneurs Council, a group that does special programming for the business community, including a Technology

<sup>12</sup> [www.ci.boulder.co.us](http://www.ci.boulder.co.us)

<sup>13</sup> [www.lci.des-moines.ia.us](http://www.lci.des-moines.ia.us)

<sup>14</sup> [www.dmoed.org](http://www.dmoed.org)

<sup>15</sup> [www.fcchamber.org](http://www.fcchamber.org)

<sup>16</sup> [www.ci.fort-collins.co.us](http://www.ci.fort-collins.co.us)



Entrepreneurs Showcase. They also organize the Annual Small Business Celebration – a series of showcase and award events for the city’s top 10 small businesses of the year.

- The Chamber also houses the Entrepreneurial Growth Resource Center (jointly sponsored by the University of Missouri in Kansas City), which promotes and initiates programming activities and strategic alliances with academic and business communities in Kansas City.<sup>17</sup>
- Technology Fast 50 awards are given out each year to the fastest growing technology companies in the city.

#### Kauffman Center for Entrepreneurial Leadership<sup>18</sup>

- This organization sponsors the Kauffman Gathering of Entrepreneurs, a facilitated learning session allowing entrepreneurs of rapidly growing companies to share knowledge and network with one another. This program focuses on financing, organizational building, and leadership.

#### Madison

##### City of Madison<sup>19</sup>

- The City of Madison has an Office of Business Development. The front page of their web site provides links to highlighted businesses in the community, including the MGE Innovation Center, Madison’s business incubator. This department provides a Technology Business Page that includes the Greater Madison Area Directory of High-Tech Companies, and several helpful links: MGE Innovation Center, the University of Wisconsin Science Center (the next stage for a business that outgrows the incubator), the University of Wisconsin Biotechnology Center, and the Wisconsin Innovation Network.

##### The Wisconsin Innovation Network<sup>20</sup>

- This organization directs state economic development efforts in biotechnology and high-tech. They sponsor two Wisconsin Venture Conferences, one focused toward high-tech only and one specifically for biotechnology – both are open to the entire country. They also organize a high-tech consortium with monthly speaker luncheons.

#### Omaha

##### City of Omaha

- The website contains an interactive map on which citizens can click on an area of town to see who the City Council Representative is

<sup>17</sup> [www.bsbpa.umkc.edu/egrc](http://www.bsbpa.umkc.edu/egrc)

<sup>18</sup> [www.entreworld.com](http://www.entreworld.com)

<sup>19</sup> [www.ci.madison.wi.us](http://www.ci.madison.wi.us)

<sup>20</sup> [www.wisconsininnovationnetwork.com](http://www.wisconsininnovationnetwork.com)



### Greater Omaha Chamber of Commerce<sup>21</sup>

- There is a communications technology page on the Economic Development's web site that actively promotes Omaha as an optimal location for telecommunications companies, listing telecommunications connections and quality of life as the primary factors.
- Economic Development Council site provides a detailed narrative description of the communications infrastructure, technology education, types of technology businesses in the city, financial incentives, a description of the labor force, economic indicators, and quality of life.
- Great Plains Minority Supplier Development Council provides assistance to certified minority-owned businesses

### Service Corps of Retired Executives (SCORE) Counselors to America's Small Business<sup>22</sup>

- This group of retired individuals provides business planning and strategy planning services for a limited or no fee.
- Provides monthly workshops on business plans, loans and capital, marketing and advertising, business insurance, taxes, law, and records and accounting.

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<sup>21</sup> [www.omahachamber.net](http://www.omahachamber.net)

<sup>22</sup> [www.tandt.com/score/bic.asp](http://www.tandt.com/score/bic.asp)



## Recommendations for Improving Lincoln's Competitive Position

It has been estimated that advanced Internet solutions can bring a 40% US productivity increase in the next decade.<sup>23</sup> Communities that have the infrastructure and aggressiveness to take advantage of this potential will be the economic winners in the New Economy.

The City of Lincoln has taken a giant leap forward to securing a positive future in the New Economy. The formation of the Technology Council has raised the awareness in the community of the importance of advanced telecommunications services and how this essential 21<sup>st</sup> century infrastructure plays an essential role in current and future economic success. The Technology Council has developed the foundation for Lincoln to make significant improvements in virtually all economic sectors of the community. The challenge for Lincoln is to leverage the work of the Technology Council to create specific measurable successes.

### Leadership & Project Coordination

"The communities that are most optimistic and ready for the new economy practice "collaborative advantage." They enjoy tight relationships at the intersection of their business, government, education, and community sectors, which provide regional resiliency and a unique ability to set and achieve longer-term development goals."1

The first priority in moving the process to the next level is to solidify business participation, leadership, and support for the Connecting Lincoln workshop. Currently, there is scattered support from the business community; the initiative has been largely City and University driven. **Engaging the business community** to support this program is essential. In the research leading to this report, often times the word complacent was mentioned when describing the Lincoln business community.

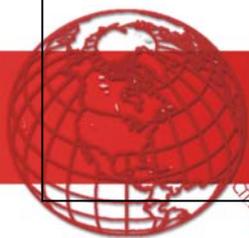
There is no immediate business crisis in Lincoln right now, but that does not negate the need for the business community to develop strategies for ensuring Lincoln's future economic success. In the Silicon Valley for example, a report called an "Economy at Risk" helped bring the business sector group to the table to begin focusing on how to make improvements in the Valley's competitive position. Lincoln must identify the catalyst that will bring the business community fully into the Connecting program.

<sup>23</sup> The Net Impact Study, University of CA, Berkeley and Brookings, 2001.



The reality is that if Lincoln businesses do nothing at this point, the community will survive but may not advance in the new electronic economy. The threat to Lincoln's economic sustainability is subtle; as other communities learn how to best position themselves in the New Economy for economic and community success – and Lincoln remains introspective and complacent – the community will become marginalized. The Technology Council has done an excellent job in beginning to raise awareness about the need for Lincoln to improve its competitive position, now we should focus on implementing specific ideas and programs to make improvements in Lincoln's competitive position.

Transform the existing **Technology Council into a coordinating committee** that monitors and reports on Lincoln's ongoing transformation into a world-class community for technology-based businesses. The coordinating committee should annually develop a work plan for Lincoln, identifying high-value projects and programs to implement. The coordinating committee would then work with sub-committees who develop the concepts further and implement the ideas. This coordination can play a significant role in helping all sectors of the community become better connected. For example, the coordinating committee could help organize a series of lectures over a year for doctors' offices (and other small professional offices) to help them become better connected and improve their businesses practices using advanced telecommunications and technologies. The coordinating committee can also take responsibility for developing and publishing an annual benchmarks report that will plot the progress of the region in making improvements in its economic competitiveness. The Silicon Valley, Boston, Orange County, and others put out effective annual reports on New Economy measures/economic development that can be used as a model for Lincoln, see <http://www.jointventure.org/resources/2002Index/index.html>  
<http://www.mtpc.org/theindex/theindex.htm>  
[http://www.marylandtedco.org/resources/publication\\_pdfs/TEDCO\\_7\\_9.pdf](http://www.marylandtedco.org/resources/publication_pdfs/TEDCO_7_9.pdf).



### Action Items and Responsibility Checklist

Lead Agency	Support Agencies	Initiatives and Milestones
LPED	LIBA, DLA	<u>Business Support</u> <ul style="list-style-type: none"> <li>LPED, DLA, and LIBA boards discuss how they will formally support the Connecting initiative. Implement their recommendations.</li> </ul> Target completion – 2 <sup>nd</sup> Quarter, 2002.
Technology Council	City, University	<u>Coordinating Committee</u> <ul style="list-style-type: none"> <li>Task the Technology Council to develop a plan for transforming the Council to a coordinating committee.</li> <li>Implement the new coordinating committee and develop a work plan for the balance of 2002. This report has many recommendations that may serve as the basic work plan for the coordinating committee for the balance of 2002.</li> </ul> Target completion – March/April 2002.

### Telecommunications

The telecommunications providers who participated in the community assessment workshop and interviews were extraordinarily open and willing to share information. Several of the telecommunications providers made infrastructure maps available for this report. In the appendix, there are maps from ALLTEL, Lincoln Electric, Sprint, and Aquila. These maps will provide a good start for the construction of a more detailed regional telecommunications services map.

Construct a **telecommunications map** that shows the telecommunications providers and services in Lincoln. Ultimately, the goal should be to build an interactive web page that would allow the user to identify the specific providers that could serve a residence or business. Arizona has developed such a site, <http://www.arizonatele.com>.

Use the creation of the map to identify specific areas in Lincoln that requires advanced services, more redundancy, and create a strategy for addressing those gaps. Use the map to highlight to prospective businesses the providers in Lincoln and the location of advanced services.

Make Lincoln a **test bed for advanced residential and commercial telecommunications services**. In communities around the nation, there are telecommunications companies testing and deploying cutting edge services. In Palo Alto, CA and Cary, NC fiber to the home (FTTH) networks are being built that offer an array of advanced services. Other communities are effectively constructing “guerilla” wireless networks using new



wireless standards 802.11x.<sup>24</sup> Still others are adopting wireless visions of the future and are working collaboratively to make their vision a reality.<sup>25</sup> The coordinating committee should work with the community telecommunications providers to set up demonstration sites and test beds for new applications. Explore how the University researchers might be involved in this effort, for example, the JD Edwards program students could develop a business plan and technical mapping for a downtown wireless network.

### Action Items and Responsibility Checklist

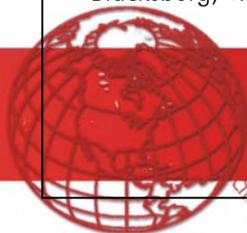
Lead Agency	Support Agencies	Initiatives and Milestones
Coordinating Committee	Telecommunications Providers, City, County	<u>Telecommunications Map</u> <ul style="list-style-type: none"> <li>• Integrate existing telecommunications facilities maps into one master document.</li> <li>• Develop a GIS map that organizations can link to for marketing Lincoln as a connected community.</li> <li>• Identify areas of the community that may require added investment to provide high-speed services.</li> <li>• Build a partnership with providers to update maps regularly.</li> </ul> Target completion – 2 <sup>nd</sup> quarter 2002.
Coordinating Committee	Telecommunications Providers, UNL	<u>Test Bed</u> <ul style="list-style-type: none"> <li>• Identify existing telecommunications providers who are interested in developing test applications in Lincoln.</li> <li>• Identify opportunities for the University to support this concept.</li> </ul> Target completion – 3 <sup>rd</sup> quarter 2002.

### Technology-based Economic Development

Many in Lincoln recognize that the economy has and is continuing to go through a fundamental transition to a knowledge-based economy or New Economy. This transition is causing governments, chambers of commerce and economic development corporations to analyze their strategies to evaluate their effectiveness in this new era. The Progressive Policy Institute has written extensively about the New Economy and has come up with a summary of how economic development is changing.

<sup>24</sup> In particular, Portland, OR and Seattle, WA, San Francisco, CA.

<sup>25</sup> Blacksburg, VA.



Old Economy	Knowledge Economy
Being a cheap place to do business was the key.	Being a place rich in ideas and talent is the key.
Attracting companies was the key.	Attracting educated people is the key.
A high-quality physical environment stood in the way of attracting cost-conscious businesses.	Physical and cultural amenities are key in attracting knowledge workers.
Regions won because they held a fixed competitive advantage in some resource or skill.	Regions prosper if organizations and individuals have the ability to learn and adapt.
Economic development was government-led.	Only bold partnerships among business, government, and the nonprofit sector can bring about change.

**Source, Progressive Policy Institute**

What the Progressive Policy Institute has found is that fundamental shifts have taken place between how things-used-to-be-done in economic development and what works today. A recent article in the Omaha World-Herald supports the notion that things have indeed changed. The article highlighted the University of NE Medical Center’s UNeMED program, designed to hatch medically related businesses from its labs. To make UNeMED work, it took government, higher education, and the private sector to develop a new collaborative model. It also took highly educated scientists and inventors to develop the new technologies and products to commercialize and a region that had the “infrastructure” to support these initiatives.

In many ways, Lincoln is still caught up in the Old Economy ways of thinking. The agencies responsible for economic development have not changed their approaches to meet current demands. Lincoln has been successful in the past and has developed tools and approaches that that worked well, but now is the time to begin making changes.

Making changes to overall economic development strategy to develop specific initiatives related to technology and technology related business is essential. Communities like Omaha are clearly heading in that direction and Lincoln should not follow them, it should lead them. Lincoln should use its unique assets and become a national leader in technology-based economic development.

Ultimately, a community and regions technology-based economic development strategy has to reflect the particular strengths and weaknesses and its business culture. A good first step would be for Lincoln’s economic development organizations to do **more research on what other communities are doing to create competitive advantage and create success**. Lincoln can learn a great deal by simply benchmarking successful communities.



Examples of other communities to consider evaluating:

*Joint Venture Silicon Valley, CA*

*Georgia's Yamacraw Initiative*

*State of Arizona Industry Clusters Development*

*City of San Diego, CA*

### **Developing Lincoln's Specific Industry Cluster Groups**

Industry clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a nation or region. Clusters arise because they increase the productivity with which companies can compete. The development and upgrading of clusters is an important agenda for governments, companies, and other institutions. Cluster development initiatives are an important new direction in economic policy, building on earlier efforts in macroeconomic stabilization, privatization, and market opening, and reducing the costs of doing business.<sup>26</sup>

The Technology Council has done preliminary work in identifying targeted industries for Lincoln. This recommendation builds on the work the Technology Council has already completed, taking the concept and developing it further with two specific industry groups. This recommendation also builds on the work the State commissioned on potential statewide industry clusters. The work of the Technology Council and the State has laid the foundation to move forward with this initiative.

Lincoln has immediate opportunities to **develop industry cluster groups for software and electronics**. Opportunities also exist in biotechnology, but this industry sector is not as advanced and defined as electronics and software.

The benefits of developing industry cluster groups include:

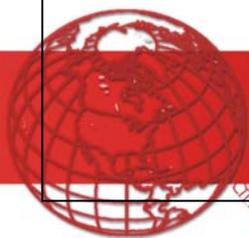
- Incubation of ideas from the UNL labs to local businesses;
- Increased business formation, increased employment opportunities;
- Opportunities to market local jobs to UNL graduates of computer sciences and engineering;
- An improved tax base;
- More diverse economic base;
- Enhancement of Venture/Angel investing opportunities;
- Increased R&D funds flowing to the community, and others.

<sup>26</sup> Michael Porter, Institute for Strategy and Competitiveness, Harvard Business School.



The industry clusters model is making a difference around the country, for example:

- <http://azhitechcluster.org/home/index.cfm>
- <http://www.azsoft.com/default.asp>
- <http://www.nvtc.org/>
- <http://www.ripolicy.org/slater.html>



Industry Cluster Dimensions <sup>27</sup> - Software & Electronics	Lincoln's Position
Traditional Cost of Doing Business Measures	
▪ Tax Structure <sup>28</sup>	+
▪ Payroll Costs	+
▪ Space Costs	+
▪ Capital Costs	+
▪ Business Climate	+
Specific to Industry Clusters	
▪ Proximity to Excellent Research Institutions	+
▪ Access to Venture Capital	-
▪ Educated Workforce	+
▪ Network of Suppliers	-
▪ Technology Spillovers	-
▪ Climate and Quality of Life	+

As the above table illustrates, Lincoln is well situated to launch an industry clusters program for both software and electronics. More research is required to determine if the biotechnology industry group is ready to organize and formally launch an initiative.

**Leveraging the University of Nebraska Lincoln**

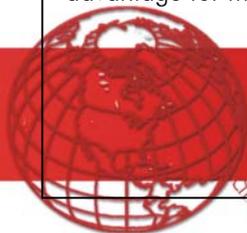
The University plays an essential role in the community's long-term economic success. There are many exciting initiatives taking place on the UNL campus, but there is a need to better coordinate these programs to produce the most significant results.

It is recommended that the University identify the appropriate person or department to **coordinate all the University's economic development related initiatives**. Examples of tasks for the coordinator might include:

- Inventory all the programs and initiatives that support economic development in Lincoln and the region.
- Develop web resources to market the University's initiatives.
- Review University policy related to technology transfer. Develop policies that encourage faculty to commercialize technologies, ideas, and products.
- Help organize research and development applications for funding into targeted industry categories (i.e. software, electronics, biotechnology, etc.).

<sup>27</sup> Blueprint for High-tech Clusters, Ross DeVol, 1999.

<sup>28</sup> Boyd and Co. report, 2002 confirms tax structure, payroll, and space costs create competitive advantage for many Midwest communities.



- Gain important private sector support for applications for funding R&D programs that match the community's economic development goals.

Our research for this study revealed there are exciting and important initiatives the University is pursuing that could dramatically help the community improve its economic competitiveness. Basic coordination of those efforts would produce meaningful results for UNL and the community.

The University should develop a **targeted research and development** program to support emerging industry cluster groups in software development, electronics, and biotechnology. Through a targeted and strategic approach, the University can help develop products and services from its research and development labs to commercialization.

**Become one of the most wired campuses in the US.** Yahoo Internet Life annually ranks universities and colleges on their connectedness. UNL was not listed in the top 50 universities in the 2001 rating. By fully developing the campus wireless network and by promoting UNL as a high-tech campus, it should be ranked highly in the Yahoo ranking.

Analyze where undergraduate and graduate students in the Computer Sciences and Engineering programs are going post UNL. **Develop a specific targeted campaign to keep these students in Nebraska and Lincoln.** There is a strongly held perception that Nebraska and Lincoln are not competitive for technology-based jobs. With added marketing and awareness, more graduates should be able to find local work.

#### Venture and Angel Investing

A critical program to the success of newly formed and emerging businesses is access to capital. Lincoln has a program underway, the Nebraska Enterprise Forum (NEF) that links funders with entrepreneurs. Evaluate ways to expand the NEF to provide enhanced services to entrepreneurs and technology businesses that may include more technical training and resources developed for clients, expanding the membership to include more local banks and financial institutions, and holding an annual investors summit in conjunction with Omaha to discuss and debate regional VC/Angel investing issues. Examples of programs in other communities abound, see Madison, WI. [http://www.wisconsininnovationnetwork.com/madison\\_vf.html](http://www.wisconsininnovationnetwork.com/madison_vf.html). Also, see agenda from a Boise, ID based VC/Angel investing conference in Appendix B.

#### Leveraging assets

There are exciting initiatives taking place right now in Lincoln that require **more business support**. On their own, these programs and initiatives can succeed, but to fully realize their potential for economic development and business creation, the Lincoln business community has to get more involved. These initiatives include for example, the Prairie Fire supercomputer, Great Plains Software Initiative, the JD



Edwards program, UNL's participation in Internet 2 (<http://www.internet2.edu/>), the NE Center for Entrepreneurship, the Lincoln Technology Park, and the Center for Excellence in Electronics. These community assets must be leveraged and utilized by local businesses to produce the most value. The business community must learn more about these initiatives and become active participants to make them successful.

One example of how an organization is leveraging Lincoln's assets today is Lincoln Electric System. LES is taking advantage of the JD Edwards program to develop an approach to integrating its software systems to create internal efficiencies. LES is providing critical support for a new program and receiving highly valuable services in exchange.

The most immediate opportunity to leverage existing assets is to create a strategy and identify funding sources to **build out the next phase of the Lincoln Technology Park**. The financing and construction of the next phase should be one of the highest priorities for the Lincoln business community. In the short term, there are no better programs for creating new knowledge based jobs and fostering business formation in the community.

#### Outcome Based Economic Development

Economic development is inherently a public private venture. Different models are used in differing parts of the US, Lincoln has settled on a model of a jointly funded (i.e. public and private) economic development corporation. In the past, many governments consolidated its economic development programs with those of the private sector. When these consolidations were made, it was rare that performance and expectations of the new entity were clearly outlined. Today, more governments are requiring contracts with the economic development corporations to clearly outline the performance expected.

**Develop a contractual relationship** with the Lincoln Partnership for Economic development that outlines the City's specific economic development goals relating to technology economic development initiatives. It is recommended that the contract begin simply, by identifying projects and programs such as *developing a web portal* for technology and biotechnology companies to access information on Lincoln, *develop a targeted set of promotion materials* for distribution to prospective businesses, *supporting the industry clusters concept*, and *coordinating regional technology-based economic development initiatives*. The Partnership could oversee a broad based marketing program targeted to improve Lincoln's image as a technology haven. This might include the University department of Computer Sciences and Engineering<sup>29</sup> and the JD Edwards program sponsoring lectures over a year that can

<sup>29</sup> The Chair of the department mentioned holding these types of seminars in another community that helped put that community and University on the national map for telecommunications expertise and knowledge.



be marketed to the community – and the results of the lectures distributed widely to further promote Lincoln as a technology hub.

### Action Items and Responsibility Checklist

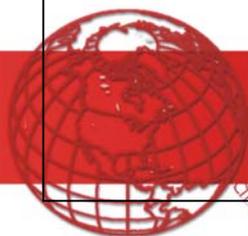
Lead Agency	Support Agencies	Initiatives and Milestones
Coordinating Committee	Chamber, City, DBA	<u>Benchmarking</u> <ul style="list-style-type: none"> <li>Conduct more research into what peer communities and other communities are doing to create competitive advantage in the New Economy.</li> <li>Identify steps that Lincoln can take to further improve its competitive position.</li> <li>Use the study as a means to help engage the business community.</li> </ul> Target completion – 3 <sup>rd</sup> quarter, 2002.
UNL, Tech Park, Software and Electronics Businesses	State of NE	<u>Industry Clusters</u> <ul style="list-style-type: none"> <li>Coordinating meeting of lead agencies.</li> <li>Formal organization of two cluster groups.</li> <li>Industry clusters evaluation – Lincoln specific.</li> <li>Develop specific initiatives for 3<sup>rd</sup> and 4<sup>th</sup> quarters of 2002.</li> </ul>
UNL, Tech Park, Biotech Businesses	State of NE	<u>Industry Clusters</u> <ul style="list-style-type: none"> <li>Hold a focus group meeting to determine if there is enough interest/ number of businesses/synergy to form an industry cluster group in biotech.</li> </ul> Target completion – 4 <sup>th</sup> quarter, 2002.

Continued on the next page



Lead Agency	Support Agencies	Initiatives and Milestones
UNL		<u>UNL Coordination</u> <ul style="list-style-type: none"> <li>Inventory various programs that related to and support local economic development.</li> <li>Devise a mechanism to report regularly on UNL based initiatives and market them to the community.</li> <li>Identify a resource person, department, etc. to take the lead in coordinating these initiatives.</li> </ul> Target completion – 3 <sup>rd</sup> quarter, 2002.
UNL, Coordinating Committee, Technology Park, Industry		<u>Targeted R&amp;D</u> <ul style="list-style-type: none"> <li>Work with an industry group, the Technology Park, and Coordinating Committee to develop a simple list of targeted R&amp;D opportunities that can support technology transfer and commercialization.</li> </ul> Target completion – 3 <sup>rd</sup> quarter, 2002
UNL		<u>Wired Campus</u> <ul style="list-style-type: none"> <li>Accelerate plans to build a wireless network on the campus.</li> <li>Market UNL’s connectedness to prospective students and the media.</li> </ul> Target completion – 1 <sup>st</sup> quarter, 2003
UNL		<u>Retain Talent</u> <ul style="list-style-type: none"> <li>Update and analyze the past two years of data on graduates from the University’s Computer Sciences and Engineering programs to determine where the students went and why.</li> <li>Identify specific strategies for advertising local opportunities for graduates to minimize the loss of talent to other regions.</li> </ul> Target completion – 4 <sup>th</sup> quarter, 2002.
Nebraska Enterprise Forum	LPED, Chamber, LIBA, DLA	<u>VC/Angel Investing</u> <ul style="list-style-type: none"> <li>Analyze how Forum’s in other regions are adding value and creating linkages between investors and entrepreneurs.</li> <li>Identify specific programmatic changes to implement.</li> <li>Organize a VC/Angel conference in the Lincoln/Omaha region in late 2002.</li> </ul>

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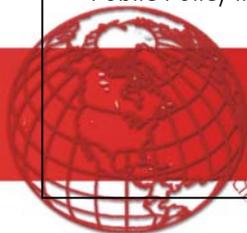
Lead Agency	Support Agencies	Initiatives and Milestones
LPED, UNL, Technology Park, Chamber, DLA, Businesses		<u>Leveraging Assets</u> <ul style="list-style-type: none"> <li>Identify immediate opportunities for businesses to become involved and supportive of current initiatives.</li> <li>Work with the University coordinator to develop mechanism to market future opportunities and initiatives to the business community.</li> </ul>
Technology Park, UNL	LPED, Chamber, LIBA, DBA	<u>Construct Next Phase at the Tech Park</u> <ul style="list-style-type: none"> <li>Convene a working group to identify and secure funding for the second phase of construction at the Technology Park.</li> </ul> Target completion – 4th quarter, 2002
City, LPED		<u>Contractual Change</u> <ul style="list-style-type: none"> <li>City should develop a specific work plan for LPED regarding technology business development and marketing.</li> <li>City and LPED discuss the expectations, how it fits with current work plan.</li> <li>City and LPED negotiate a formal contract with timelines and deliverables regarding technology business development.</li> </ul> Target completion – next City budget cycle.

## Regional Economic Development

The State has recently completed an industry clusters analysis. The Lincoln community should use this study, and its findings, as the impetus to beginning a meaningful conversation with Omaha on **developing regional initiatives** to improve the competitiveness of Nebraska.

Cities on their own *can* compete well in the New Economy, but regions fare far better.<sup>30</sup> An example of a regional initiative might be the development of a **regional economic development web portal** that would focus on high-tech and biotech business retention and attraction. While not a regional portal see San Diego for an example, <http://www.bandwidthbay.org/>. Develop a **regional marketing initiative** to promote the connectedness of Lincoln and Omaha to potential businesses, as well as community members. It is envisioned that by beginning with smaller, less complex ideas and programs, Lincoln and Omaha can grow into a longer-term collaborative relationship, taking on more complex and meaningful projects and programs.

<sup>30</sup> Public Policy Institute, Metropolitan New Economy Index.



A common vision statement, slogan, icon, and selling points could be used by numerous organizations in their own promotional efforts of the communities and the State. The aim is to define this region nationally as a competitive place to live and do business, see Georgia's program as an example, <http://www.yamacraw.org/>.

### Action Items and Responsibility Checklist

Lead Agency	Initiatives and Milestones
City of Lincoln City of Omaha Lincoln Chamber Omaha Chamber Downtown Associations Business Leaders Education Leaders Technology Council -More-	<u>Regional Initiatives</u> <ul style="list-style-type: none"> <li>Plan a regional workshop to explore realistic and supportable initiatives that can advance the region's economic development goals.</li> </ul> Target completion – 2 <sup>nd</sup> quarter, 2002.

### City of Lincoln Specific Initiatives

**Encourage more local businesses to use e-commerce.** Pick a reasonable date in the future and, with the cooperation of the all the local governments, declare that all public procurement will be paperless by that date.

Develop training programs for business on how to use the technology, do this in partnership with the University or Community College. Lincoln could follow the example of the Mid-America Regional Council by setting up a regional procurement portal, for example, <http://www.marc.org/eprocurement.htm>. The strategy should include **positive incentives**. For example, partner with vendors to offer free starter websites, or digital signature technology to the first 100 companies to sign up for e-commerce classes.

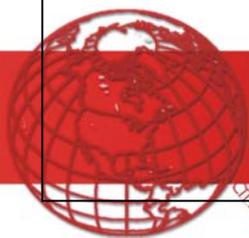
Form a **County/City e-Government committee** and charge them with identifying 3-5 high-value applications that can be jointly developed *and implemented* in twelve months. Focus on high-value applications like permitting, businesses licenses, payment capabilities, etc. This group should be made up of County/City managers, IT professionals, finance staff, and HR staff. It is recommended that the group focus on services oriented to businesses first, this can assist in getting more business connected and using advanced technologies. Leverage or evaluate refocusing the existing group, the Government Access and Information Committee (GAIC), to serve in this function.

Organize a **builder's summit** to educate builders on the newest home and business technologies. Use this summit as the forum to begin the dialogue regarding the development of standards and practices for new development/connectivity standards. See how San Diego markets wired buildings for example,



<http://www.bandwidthbay.org/main.htm> and an example of a builder's summit, [http://www.greatvalley.org/nvc/builders\\_index.htm](http://www.greatvalley.org/nvc/builders_index.htm).

Add new components to the City's **comprehensive plan** that include standards for telecommunications construction in new neighborhoods and commercial construction and addresses opportunities to leverage construction in the community's rights-of-way to construct dark conduit for future use. Lincoln has an opportunity to develop innovative solutions to creating opportunities for joint trenching and dark conduit construction when rights-of-way are being worked in. Partnering with telecommunications and other utilities to develop these solutions can produce significant value. It is estimated that more than 50% of the cost of constructing a fiber optic run is construction cost. Any measures that can be implemented to reduce construction costs for telecommunications companies and reduce repeated street cuts benefits the entire community.



## Action Items and Responsibility Checklist

Lead Agency	Support Agencies	Initiatives and Milestones
City, County, School District	Chamber, DLA, LIBA, Businesses	<u>e-Commerce</u> <ul style="list-style-type: none"> <li>Conduct a focus group with businesses to discuss this concept and to develop a plan to implement the solution.</li> <li>Identify a date certain when governments will move to online procurement.</li> </ul> Target completion – 2 <sup>nd</sup> quarter 2002.
City, County		<u>e-Government</u> <ul style="list-style-type: none"> <li>Hold an organizing meeting between the City and County to begin the process of developing a strategic plan for e-Government. Identify 3-5 short-term projects and programs to collaborate on to improve online services to businesses.</li> </ul> Target completion – 3 <sup>rd</sup> quarter 2002.
City, County	Builders, Contractors	<u>Builders Summit</u> <ul style="list-style-type: none"> <li>Organize a builder's summit to demonstrate how to build wired communities.</li> <li>Begin the process of developing planning guidelines for telecommunications in new construction.</li> </ul> Target completion – 4 <sup>th</sup> quarter 2002.
City, County	Telecommunications Providers	<u>Comprehensive Plan</u> <ul style="list-style-type: none"> <li>Revise comprehensive plan to reflect telecommunications changes.</li> </ul> Target completion – prior to adoption of the new plan.

### Healthcare

Successful communities in the New Economy know how to put technology to work to improve everyday life. Born of necessity, telemedicine is rapidly gaining acceptance in the US as a tool to improve access to health care. A side benefit of telemedicine is that doctors' offices get connected and they learn how to put cutting edge technologies to work in their businesses. Lincoln has a unique opportunity to define and develop the statewide program for telemedicine.

### **Case Study on University of California Davis:**

Telemedicine is a powerful tool that is enabling UC Davis to bring high-quality health care to a large and diverse patient population throughout Northern California. While the program began to improve access for patients living in remote, rural areas of the



state where there were few or no physicians, it now has grown to include more than 20 telemedicine and teleconferencing sites and the only telemedicine training center west of the Rockies.

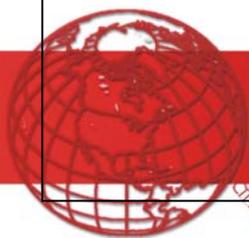
The UC Davis Office of Regional Outreach and Telehealth was established in 1996 with a mission of improving access to the health-care resources available at UC Davis for residents and physicians throughout Northern California.

In just four years, the program has grown into one of the largest and most respected in the nation. Its innovative alliances with hospitals and clinics throughout Northern California have allowed thousands of patients to receive health care in their own communities. The projects have also strengthened rural health-care delivery systems and lessened rural doctors' isolation. It has also made health care available to schools that can no longer afford full-time school nurses, homebound seniors and others who face transportation problems, and inmates in correctional facilities that lack on-site physicians, among others. Telehealth Magazine, a leading trade journal, has ranked the UC Davis program among the nation's 10 best for the last four years. Resources:

- [http://www.ucdmc.ucdavis.edu/research/health\\_system\\_research/UCDtele.htm](http://www.ucdmc.ucdavis.edu/research/health_system_research/UCDtele.htm)
- <http://www.telemedicine.alaska.edu/>.

Lincoln health providers are already beginning to develop telemedicine programs, such as Madonna Rehabilitation. It is recommended that Lincoln collaborate with Omaha and the University of Nebraska Medical Center to lead the effort to **develop a statewide telemedicine initiative**. The benefits to Lincoln are:

- Establishes Lincoln at the forefront of the utilization of new technologies in medicine.
- Increases business for local doctors and hospitals.
- Improves connectivity in rural NE.
- Improves access to health care for rural NE.
- Creates linkages with health care providers in Omaha and fosters better coordination and collaboration in the region on medical issues.



### Action Items and Responsibility Checklist

Lead Agency	Support Agencies	Initiatives and Milestones
Leadership Needs to be Developed	Hospitals, Doctors' Offices, Insurance Providers, State, More	<u>Telemedicine</u> <ul style="list-style-type: none"> <li>Plan a telemedicine summit meeting in Lincoln to discuss current telemedicine programs underway, best practices, and to do strategic planning on how to proceed with a state-wide initiative.</li> </ul> Target completion – 3 <sup>rd</sup> quarter, 2002.



## Methodology

HDR's assessment approach provide a broad look at the community and its assets, and analyses how well that community can function in the New Economy. Specifically targeted areas include telecommunications infrastructure, economic development programs, university/community relationships, marketing initiatives, quality of life, and evaluating educational attainment.

### HDR's Process



### Phase 1

The first step was to coordinate and strategize with the Technology Council on the assessment process.

### Phase 2

The second phase of work included gathering specific information on the current state of Lincoln's technology infrastructure, conducting a community workshop on telecommunications issues, performing a baseline economic assessment.

#### Community Assessment

##### Workshop

The Connecting Lincoln Workshop was held on January 8<sup>th</sup>, 2001 at the Champions' Club on the University of Nebraska. HDR utilizes an assessment tool created by the Computer Systems Policy Project (CSPP)<sup>31</sup> specifically developed to assist communities becoming more competitive in the New Economy by providing a framework to determine how prepared a community is today, where improvements can be made,

<sup>31</sup> [www.cspp.com](http://www.cspp.com)



and specific action initiatives needed to achieve the defined goals. Six sectors were identified to participate: business, government, community-based organizations, education, libraries, and health care.

The assessment asked industry leaders from different segments of the community to rank six areas of technological impact according to four stages:

- **Stage 1:** High-speed services are hard to get or expensive; few take advantage of the resources and services on the Internet.
- **Stage 2:** High-speed services are more widely available; local web sites are limited.
- **Stage 3:** General access to high-speed services; web sites support transactions; organizations beginning to restructure for the New Economy.
- **Stage 4:** Universal access to affordable, high-speed services; the Internet has changed the way all organizations operate; the Internet is fully integrated into everyday life.

In addition, participants described their visions for the community and identified potential action initiatives to improve Lincoln's competitiveness. As this report will show, the CSPP Assessment Tool leads to implementation of innovative, community-based solutions for improving the technology infrastructure and education and training programs in schools and universities.

#### **Technology Infrastructure Analysis -- Availability/Usage Assessment**

HDR used a combination of personal interviews, phone interviews, and information from the community workshop to gather this data. Additionally, national economic benchmarking studies were utilized.

#### **Economic Analysis**

HDR conducted a baseline analysis of the City's economy to determine its current and future telecommunications requirements. This analysis focused on what kinds of services were needed today and what kinds of services will be required in the future to retain existing businesses as well as attract new businesses to the community.

#### **Benchmark Cities Assessment**

Seven communities were identified as benchmark communities for Lincoln, Nebraska. They are:

- Boise, Idaho
- Boulder, Colorado
- Des Moines, Iowa
- Fort Collins, Colorado
- Kansas City, Missouri

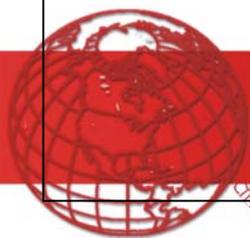


- Madison, Wisconsin
- Omaha, Nebraska

Data was gathered on these seven communities through a combination of Internet research, national economic analysis studies, and phone interviews.

### Phase 3

In the final phase of work, HDR compiled the information generated in the assessment process and developed this report. A presentation to the Technology will follow.



## Lincoln and the Networked World

As home to both the state capital and the largest University in Nebraska, Lincoln is a community rich in academic opportunities, and governmental tradition. Lincoln serves an important role in the State, and it's stable economy and high quality of life make it well positioned to become the technological leader for Nebraska, helping to bring the state fully into the New Economy. The nation is beginning to take note of Lincoln and its potential.

- Lincoln ranked 22<sup>nd</sup> out of 134 smaller metro areas in a national survey by Cognetics of Boston, Massachusetts who evaluated communities and their success rate in fostering the startup of growth companies.
- Lincoln is ranked 10<sup>th</sup> in the nation among cities of similar size on the Digital City Survey that examines how city governments have progressed in adopting and utilizing digital technologies to improve the delivery of services to their citizens.
- The Great Plains Region is ranked in the top 20 on the "Best Deals for Technology Professionals" based on 2001 salary data and ACCRA cost of living.

Participants at the workshop overwhelmingly expressed a desire to move forward with connectedness initiatives in both individual sectors and the community at large. To make this vision a reality, all sectors of the community have to come together and share this vision of the future. For Lincoln, Nebraska there are challenges that must be addressed, and strengths that must be built upon.

Some of these challenges are illustrated in the following Development Report Card from the Corporation for Enterprise Development (CFED).<sup>32</sup> The CFED reports on all 50 states and how well they are performing from an economic development perspective. Nebraska ranks poorly in four of the five categories rated in the study.

### Nebraska Development Report Card

2001 Development Report Card Grades	
Performance	B
Business Vitality	F
Development Capacity	C
Competitiveness of Existing Businesses	C
Entrepreneurial Energy	D

The Development Report Card's indexes capture important development issues and trends. The grades provide a snapshot of how a state has fared in the three categories of:

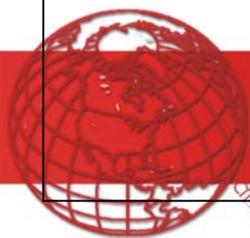
<sup>32</sup> [www.cfed.org](http://www.cfed.org)



- **Performance** (employment, earnings & job quality, equity, quality of life, and resource efficiency)
- **Business vitality** (competitiveness of existing businesses, structural diversity, entrepreneurial energy)
- **Development capacity** (human resources, financial resources, infrastructure resources, amenity resources & natural capital, and innovation assets).

While Nebraska businesses had very few business closures, the creation of new business is low (44th ranking in the nation). An additional difficulty for the state is in the area of workforce diversification to encourage employment in high-growth industries; Nebraska's workforce is more heavily concentrated in nationally declining industries, which may hinder economic development in the future (dynamic diversity 46th). Trends from the past five years and a breakdown of Nebraska's scores can be found in Appendix E.

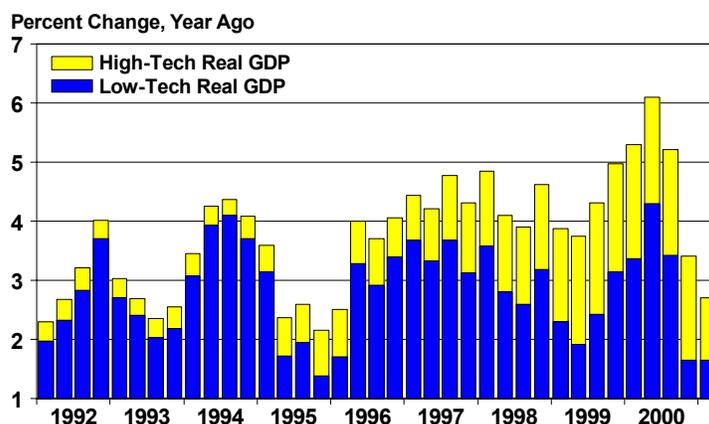
Lincoln's challenge is identifying strategies that work at a local and state level and are reflective of Nebraska's overall strengths and weaknesses.



Why does this matter to Lincoln?

In the past five years, the percent of the on-line American population has doubled.<sup>33</sup> By 2005, it is projected that 100% of the country will be online. In 2000 alone, worldwide wireless Internet users almost tripled. In that same timeframe, US retail commerce grew 200% and Business-to-Business e-Commerce doubled, bringing in a record \$45 Billion and \$213 Billion respectively. As these statistics and the following graphics suggest, the New Economy is building speed in terms of it's impact to businesses and organizations, despite the recent dot.com fallout; in fact, the New Economy is booming.<sup>34</sup>

High-tech versus Low-tech GDP (Source: Milken)



The Milken Institute has found that even in economic slow downs, the gross domestic product for high-tech outpaces other industries, most recently by a significant percentage. Communities can't ignore the local, regional, and national significance of technology-based industries to overall economic health. Pursuing a strategy of developing, retaining and attracting technology-based businesses has a significant impact on local economies.

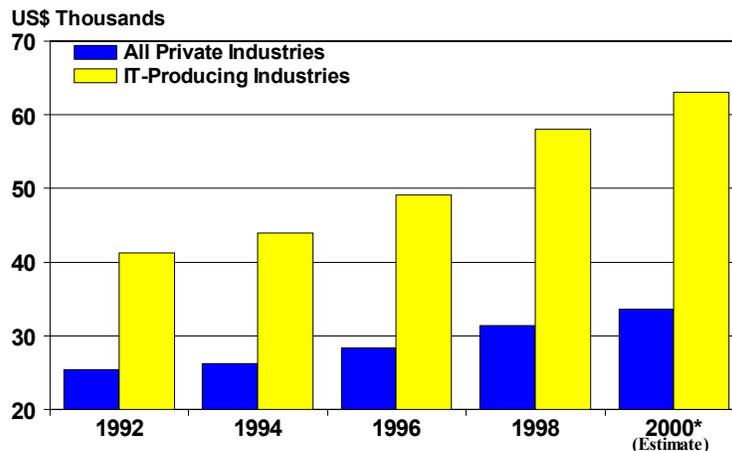
Further in numerous national studies, it has been shown time and time again that technology-based jobs pay better than non-technology related jobs. Local wealth generation in regions that have high concentrations of technology-based jobs is outpacing areas more dependent on old-economy jobs. The following table depicts annual wages for workers in the US in technology and non-technology jobs.

Wage Rates in the United States

<sup>33</sup> Jupiter Internet Population Model, 4/00

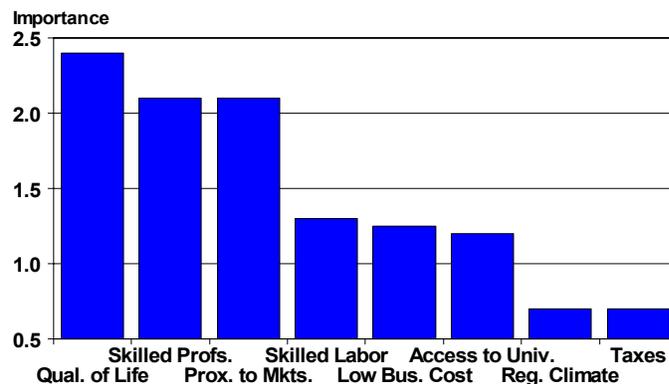
<sup>34</sup> Milken Institute





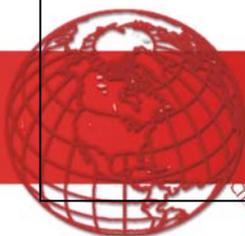
The future of a city's and regions like Lincoln largely depends on the decisions of individual entrepreneurs, investors, and creative workers who choose to locate their businesses in the community. Communities that can create a competitive advantage to attract these kinds of entrepreneurs, investors, and knowledge workers will succeed in the New Economy. The Bank of Boston found that the three top factors mentioned by technology based businesses when making location decisions are entirely unrelated to traditional factors, such as taxes/structure, the regulatory climate, and cost of operations.

#### Factors in Location of Technology-based Businesses



Source: Bank of Boston

For Lincoln to participate in the New Economy, we need to ensure that all sectors understand the opportunities and all sectors get connected. But it is not enough to lay fiber optic cables and put up radio towers. We must also learn how to put this new



infrastructure to best use, and change the way we work, live, and learn. Communities that are successful in the New Economy share some of the following characteristics.

**Business.** Companies are dependent on e-mail and the Internet to do business. Intranets are being deployed to ease administrative burdens in Human Resources and Finance. Electronic commerce is saving time, cutting costs, and increasing sales. Job candidate interviews are being conducted by videoconference to save travel time and money. Electronic networks are giving suppliers access to their customers' production schedules. Organizational structures are flattening as information moves directly to the people who need it, no matter where they are located. And some employees are teleworking.

**Education.** Our children are information literate when they graduate from middle school. They know how to communicate by e-mail, use industry standard software packages and know how to conduct research on the Web. They understand the importance of secure transactions, and how to protect their privacy. The Internet supports lifelong learning for workers who want to pursue an advanced degree or learn new skills.

**Community-based Organizations.** E-mail helps churches, charities, Little Leagues, and soccer teams announce events, call for volunteers, and raise funds without having to spend scarce resources on printing and postage. Web sites help people find out about services they need, and help staff keep informed about grant opportunities and legislative actions. Community-based organizations begin to leverage technology to create portals for accessing organizations and services.

**Government.** Putting public services online can help residents get the information they need, when they need it. Businesses and homeowners can avoid time-consuming trips to government offices to get forms and to submit permit applications. Electronic procurement can make the purchasing process more efficient for the government organization and suppliers. Also, e-mail from voters to elected officials can aid in decision-making.

**Healthcare.** Hospitals and doctors offices are investing in technology and are seeing the return. Patient records are in a digital form and easily accessible. Doctors use the Internet for research and to collaborate with other professionals. Patients send email to doctors in a secure environment, making accessing health care easier and more convenient.

**Residents.** Community members are connected via fast connections and are using the Internet to purchase goods and access services. Informal electronic networks are used to communicate within the community on areas of interest; technology brings together the community in new and exciting ways.



## Lincoln Demographics

### Population Fast Facts

- As of the 2000 Census, Lincoln has a population of 250,291. Those ages 25-44 represent one third of that population
- The population has increased 14.6% over the last 10 years

### Education Fast Facts

- Lincoln is home to seven higher educational institutions, including the flagship branch of the University of Nebraska. Additionally, Nebraska Wesleyan University, Union College, Doan College, Southeast Community College, Lincoln School of Commerce, and the College of St. Mary are also located in Lincoln.
- The majority of Lincoln's working population has at least a high school diploma (88%). 38% of the community has a Bachelor Degree or higher.

### Housing Fast Facts

- Housing costs in Lincoln are below the national average<sup>35</sup>
- National Association of Home Builders Housing Opportunity Index
- 4,251 building permits were issued in 2001, a small decline from the 4,347 in 2000.

### Infrastructure Fast Facts

- Centrally located, Lincoln is within easy access of major midwestern markets. Located 80 miles from the Nebraska/Iowa border on Interstate 80, and offers a well-established network of transportation facilities permitting rapid and economical access throughout the Midwest and to national markets.
- Burlington Northern/Santa Fe and Union Pacific provide rail and piggyback transportation. Daily passenger service and package express is provided by Amtrak
- The Lincoln Municipal Airport is classified as a non-hub, primary commercial service airport providing daily services to Chicago, Denver, Minneapolis, Kansas City, and St. Louis.

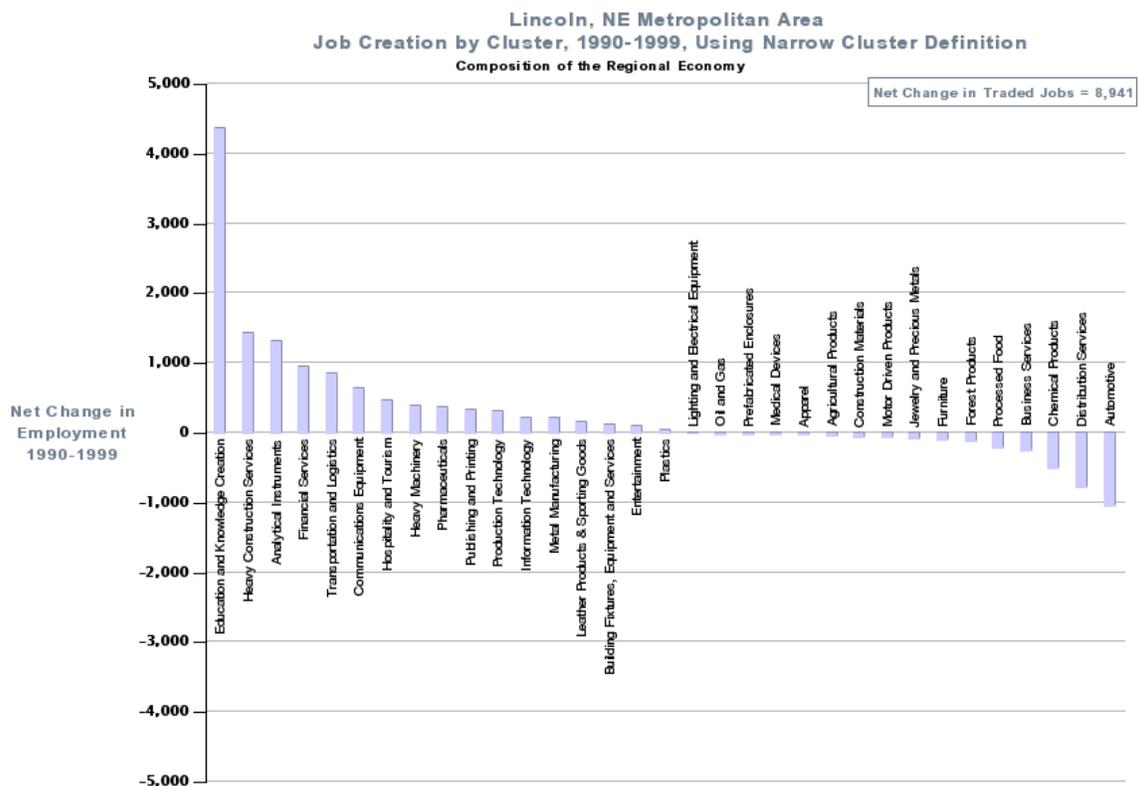
<sup>35</sup> [www.bestplaces.net](http://www.bestplaces.net)



## Employment Fast Facts

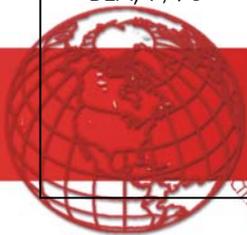
- Lincoln's business environment is a combination of major corporations and small businesses, creating a foundation for economic growth. The City has over 70 companies with a work force of 200 or more employees each.
- Lincoln boasts a consistently low unemployment rate of 2.3%
- Job growth is projected at 4.8% through 2004
- 155,265 of Lincoln's population was employed in 2000
- Projected 2025 employment: 1,227,100<sup>36</sup>

The following table provides a summary of job creation from 1990 to 1999. It's broken down by cluster.

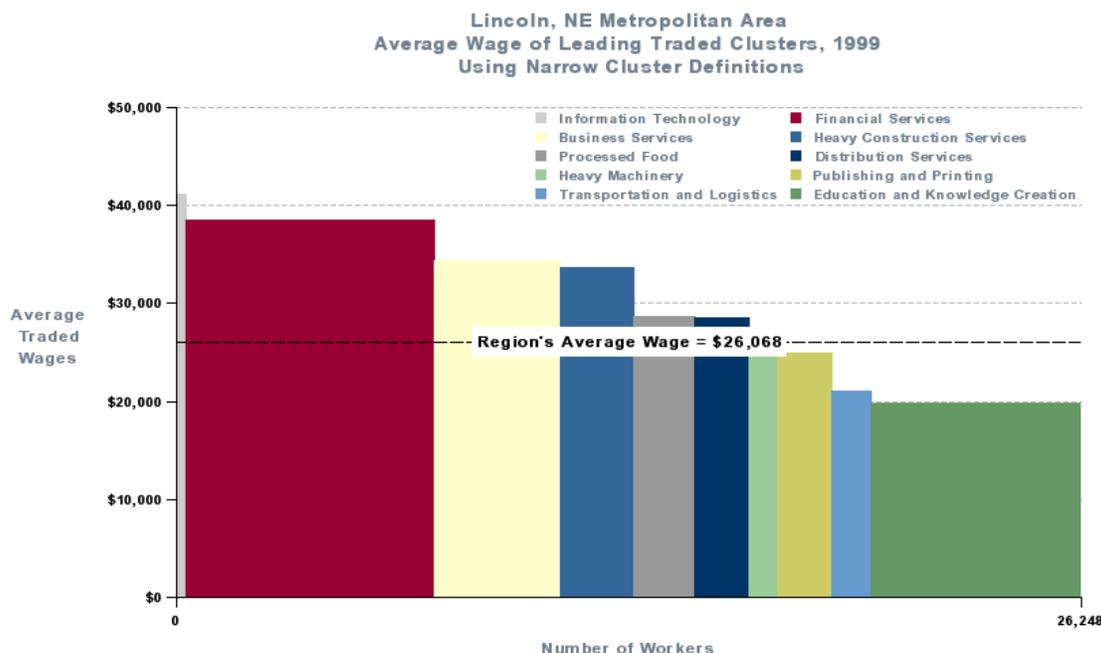


Source: Harvard University

<sup>36</sup> BEA, 7/95



As the table below shows, Lincoln’s most highly paid workers are in three knowledge-based industries: IT, financial services, and business services.



Source: Harvard University

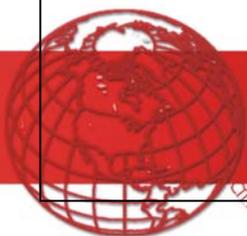
### Employment Trends in the decade of 1990-2000

- Overall annual employment growth rate was 2.46%
- Total employment growth: 33,518 employees
- Annual average employment increase: 3,352 employees/year
- Jobs per capita:
  - 1990: 0.57
  - 2000: 0.62
- Share of Nebraska employment
  - 1990: 16.7%
  - 2000: 17.4%
- Share of State employment growth: .5%
- In the decade between 1990 and 2000, construction employees in the City of Lincoln grew by 71% - an increase of 3,300 additional workers

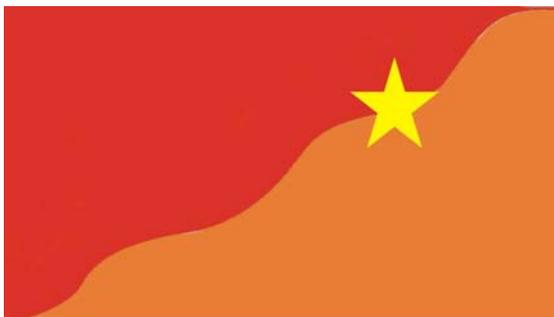
There were 91 technology-related businesses in Lincoln in 1999. The following table breaks those companies down by size and industry.



Industry	Employment Size			
	1-19	20-99	100-499	>499
Computer & electronic product manufacturing	8	3	5	0
Computer & peripheral equipment manufacturing	1	0	0	0
Communications equipment manufacturing	1	1	2	0
Radio, TV broadcast & wireless communication, equipment manufacturing	0	0	1	0
Other communications equipment mfg	1	1	1	0
Software publishers	10	3	1	0
Telecommunications	13	4	0	1
Wired telecommunications carriers	6	2	0	1
Wireless telecom (e.g., satellite)	6	2	0	0
Paging	1	1	0	0
Cellular & other wireless telecommunications	5	1	0	0
Satellite telecommunications	1	0	0	0
On-line information services	7	0	1	0



## Inventory of Lincoln's Technological Infrastructure



1 2 3 4  
Participants at the workshop ranked the Network at a Stage 3.

### Lincoln's Technology Vision:

*We will use our communications services to allow/enable our customers to control their quality of service, account management, and provide additional convenience to access the services available from the providers. We will provide educational assistance to customers for effective use of our services.*

## The Network – Telecommunications Providers

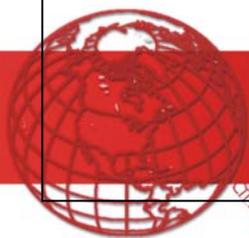
*Why is this important? A National Perspective.*

In the 1990s telecommunications companies began deploying three new technologies which offer two major advantages over regular dial-up lines: 1) much higher speeds, and 2) always-on convenience. The first new technology, Digital Subscriber Line (DSL), uses regular telephone lines. Another, the cable modem, and uses the co-axial cable installed by cable television companies. The third technology, wireless broadband, uses towers that can send high-speed signals for over 30 miles, but which require a clear line of sight. Satellite-based services are also entering the market. Each technology is capable of delivering over one million bits of data per second, a vast improvement over traditional telephone-based modems that communicate at only 56,000 bits per second.

Cable modem and DSL technologies require extensive upgrades to communications networks. Backbone lines have to be upgraded with fiber optic cable. Central telephone offices and cable head ends need new equipment to handle the high-speed signals. Wireless towers also need to upgrade their equipment. Each technology also has distance and loading limitations.

To compete in the networked world, communities need access to these high-speed services, at affordable rates. Each community needs to look into what services are available in which parts of the community. They also need to look into the number of companies competing for their business. Competition helps keep prices low and service high.

*How is Lincoln Doing?*



The telecommunications market in Lincoln is changing rapidly. A year ago, it would have been hard to find any access to residential and small business broadband services. In fact, an FCC report found that in 2000 there were no Competitive Local Exchange Carriers offering services in the Lincoln area, today there are several providers who are positioned to offer competitive services. In 2000, the FCC further noted, that there were no providers of high-speed services (more than 200kbps in at least one direction) in the entire State.<sup>37</sup>

Since then, ALLTEL and Time Warner have invested in Lincoln for both residential and small business broadband services. The demand for telecommunications services is driving these investments and catching the attention of other providers. Aquila and Sprint are poised to enter the Lincoln market in 2002 providing enhanced competition and choice for residential and business consumers.

Large businesses in Lincoln receive their telecommunications services predominantly through ALLTEL. The entrance of Time Warner into data services for large businesses (new in 2002) and the entrance of Aquila and Sprint will have a significant impact on choices for services for larger employers. Having several options for business telecommunications services in a community the size of Lincoln provides significant benefits to businesses.

## **ALLTEL**

ALLTEL is the incumbent telecommunications provider in Lincoln and provides a variety of services to the community. Within the past seven months, ALLTEL has aggressively invested in the equipment to offer DSL throughout the community. DSL services are now widely available in Lincoln, although there are small pockets with no service that are being addressed. DSL services are available in downtown Lincoln providing small and medium sized business with an alternative to dial-up. ALLTEL reports strong demand for the product and growth in subscribers has been strong. The company offers the open access model where customers can choose between ISP's with ALLTEL being one of them. Local ISP's have responded and are now offering DSL to their subscribers through ALLTEL.

ALLTEL operates nine main switching facilities in the community, with fiber optic cable linking these facilities. There are four SONET rings that support general data and voice traffic and three additional SONET rings designed to meet business demands. ALLTEL has developed a fiber map in the downtown and recently published the map in the local paper.

From a business standpoint, AllTel's most popular product is frame relay. They also have numerous clients using T-1 connections. In the coming year, ALLTEL will begin

<sup>37</sup> FCC: summary statistics on the deployment of high-speed Internet services in the US, August 9, 2001.



offering a DSL product to meet the specific requirements of the business community. ALLTEL has an advanced digital wireless network in the community and will be offering advanced services like e-911 and web browsing in the coming months. The handsets that are required for these services are still in development.

### The ALLTEL Network

- 181 route miles of fiber in Lincoln (7,600 fiber miles)
- 4.7 route miles in downtown core of Lincoln (500 fiber miles). Refer to map in appendix for routes and note proximity to business customers and dual SONET ring architecture
- Further extending capacity of the fiber network through use of DWDM (dense wave division multiplexing). This, in essence, expands by 33 times the capacity of each fiber strand
- All Lincoln central offices are connected by protected SONET rings
- Most fiber is buried rather than aerial
- Protected fiber routes from Lincoln to the outside world in all directions, over SONET facilities

### Broadband Services

- Cell relay services (ATM) – customer connectivity from T-1 speeds up to OC-3
- Frame Relay Service – customer connectivity from 56K to DS-3
- DSL – customer connectivity from 384K to 1.02mps. Current platform is DMT technology with reach of approximately 15-18K feet from DSLAM to customer. (Note: Alltel's DSL offering is an open network, i.e., other ISPs can connect and provide their service over ALLTEL DSL. This is a stark contrast to the cable provider in Lincoln.)
- Transparent LAN Service – customer connectivity at 10mps, 100mps and gigabit speeds over fiber
- Synchronous Optical Network (SONET) – transport basis for Alltel's public network and also offered to customers on both a shared and private basis. Some OC-12, however the bulk of the Lincoln SONET deployment is OC-48.
- Internet Services (High Speed, DSL and Dial) – broadband access at T-1, DS-3, OC-3 and 10/100 mps. Incremental bandwidth offerings in 3mbs increments. Alltel's uplinks to the Internet backbone are comprised of two separate, protected OC-3 connections. Upgrade to OC-12 expected mid-year 2002

### Customer/Application Examples

- Consortium of smaller Lincoln ISPs has pooled resources and connected to the Internet backbone over OC-3 connection from ALLTEL. Offices are in downtown Lincoln and connection to the fiber rings is less than one block away.



- Lincoln hospital, with offices and clinics spanning Lincoln, north to south, are utilizing a shared OC-12 SONET network with full network redundancy and entrance redundancy at their primary location.
- ALLTEL Internet services for the State of Nebraska and University of Nebraska-Lincoln (UNL) at DS-3 levels
- UNL Internet Two (I2) connection from Lincoln to I2 POP in Kansas City, at OC-3 speeds.
- Technology incubator park (UNL Tech Park) – OC-48 SONET node onsite, fully protected connection. Fiber distribution to all current and future buildings on their campus.

### Time Warner

In most communities, Cable TV companies provide more than entertainment video. They are becoming key telecommunications providers offering competitive broadband services via cable modem technology. In Lincoln, Time Warner completed the rebuild<sup>38</sup> of their network in December of 2001. The company has been aggressively marketing the service to residences and home-based businesses. Time Warner reports strong demand for their services. Time Warner can serve any resident with cable TV or cable modem service within the corporate limits of the City of Lincoln.

An affiliated company to Time Warner is Road Runner. Road Runner is a high speed, online service that provides fast access to the Internet as well as to unique broadband content and services. Road Runner is delivered to a computer over the same upgraded cable systems that currently bring cable television into your home.

Road Runner is an "always on" technology. When you click on the Road Runner icon or open your browser, you are immediately on the Internet. It is not necessary to log on or off, or to dial a phone number to get a connection. Using Road Runner doesn't involve phone lines at all – you do not tie up your primary phone line when on the Internet, nor is it necessary to pay for a secondary phone line dedicated to your computer. A Road Runner subscriber can watch a movie trailer on TV, call a friend about going to the movie and check the movie times and locations online – all at the same time.

Time Warner/Road Runner of Lincoln has just begun to offer the community business oriented services. The initial target market is smaller businesses who are seeking an alternative to slower dial-up (i.e. 56 kbps) connections, but who are not able to cost justify a more costly T-1 connection.<sup>39</sup> Time Warner/Road Runner has begun offering these alternative services, connection speeds range from 256 kbps to 4 mbps. Businesses can also choose other essential services such as web hosting, static IP

<sup>38</sup> Most cable TV systems were not designed to carry data traffic. Cable TV companies have rebuilt their systems using fiber optic cabling and typically design their systems to offer commercial data products.

<sup>39</sup> T-1 is a 1.5 mbps connection.



addresses, and others. The company has been very successful connecting small businesses, doctors' offices, and others with the business cable modem product. In addition, Time Warner/Road Runner is also beginning to offer much higher speed connections, they have recently secured their first Tiered customer, provisioning them with a 1 gigabit connection. Ultimately, businesses in Lincoln will be able to select from a 256 kbps to up to a 4-gigabit connection.

## Aquila

Following a broad national trend of traditional Utilities (i.e. electric, gas, water, wastewater) Aquila has entered the telecommunications market. This movement by Aquila and other utilities has been fueled by deregulation, the industry's merger spree, soaring consumer demand for broadband services and the freedom to move into higher-growth businesses. "Utilities always wanted to be growth companies, they just were not allowed," says Andrew Levi of Credit Suisse First Boston.<sup>40</sup>

Demand for more bandwidth, faster Internet connections, and a broader array of new products and services are creating rapid expansion in a consumer market that is expected to grow to over \$500 billion by 2003.<sup>41</sup> Formed in early 2000, Aquila Communication Services is tapping into this growth potential by focusing on targeted segments of its energy service territories to provide a range of broadband services including local and long distance voice, high-speed Internet access and digital television.

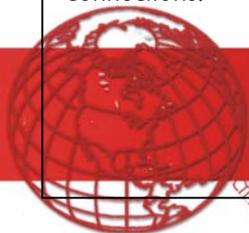
Initial Aquila efforts are concentrated in the mid-continent region in partnership with Unite, a Competitive Local Exchange Carrier serving an area north of Kansas City, and Everest Connections Corporation, a St. Louis-based telecommunications company involved in the construction and operation of broadband fiber-optic networks to homes and businesses.

The company has constructed an "overbuild"<sup>42</sup> in the Kansas City, Missouri market, and had planned to do the same in Lincoln when the capital markets dried up. They look to invest in "Energy One" communities where they own electric or gas utilities. Lincoln is an Energy One community. Their plan is to leverage their investment in an 80-mile fiber network being constructed for the School District to offer DS-3 and DS-1 (T-1) connections. Aquila is working with Lincoln Electric to potentially lease some of its fiber, and they are working with Sprint on a potential business arrangement.

<sup>40</sup>Money Magazine, October 1, 2000.

<sup>41</sup> Aquila web site.

<sup>42</sup> An overbuild is where a telecommunications company builds a competing network in a community and offers a variety of services, such as phone, cable TV, broadband, and high-speed business connections.



## Sprint

Sprint has invested in a Point-of-Presence (POP)<sup>43</sup> in Lincoln and is beginning the process of developing a marketing plan to offer commercial services to Lincoln businesses. Sprint chose a location at 14th and Avery for the POP to target large institutional and business users in the Lincoln downtown area. The construction of the POP in Lincoln and the provision of new commercial services will allow Sprint to offer commercial services that will require backhauling of data, speeding up the transmission of data and cutting costs for users. Sprint has significant fiber optic infrastructure traversing the City that serves as part of the carriers' national long haul fiber optic network.

In other communities, Sprint offers Dedicated Internet Access that provides high-speed connections to corporate Intranets or to open up a high performance pipeline to the Internet. Dedicated Access Benefits include:

- Access a corporate LAN at speeds up to OC-48
- Connect with dedicated access in 320 U.S. POPs and in 23 other countries
- Tap into the power of a separate intranet backbone for business needs
- Connect to Internet networks around the world

## Other Providers

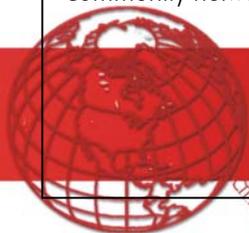
Due to Lincoln's proximity to I-80 and its rail road right-of-ways, Lincoln has several major fiber optic long haul lines running through the community, but no method to access these networks. Qwest, Level 3, and MCI all have major fiber optic lines in Lincoln and they also have "regeneration" facilities that boost the signals in the fiber strands as data moves through them. At this time, it is not known if these companies plan to provide services in Lincoln, but it is unlikely. However, this could be an option at some point if the demand in Lincoln increases to such a level that the market begins to attract a national provider.

## Summary

There is a strongly held view in Lincoln that the community does not have sufficient competition for telecommunications services. That may have been true in the past, but there are telecommunications providers who are actively targeting the Lincoln telecommunications market and will provide alternatives and competition. In addition, the existing providers, ALLTEL and Time Warner, have stepped up their investments and fully plan to compete with the new rivals.

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<sup>43</sup> A POP is a physical structure that allows for community connections to a telecommunications companies fiber optic network. POP's are essential parts of a telecommunications provider's community network.



One of the single greatest benefits of competition in Lincoln will be to develop capabilities for companies to secure redundant connections to the network to better ensure that mission critical services will be available if there are problems with one providers network. Numerous businesses have discussed their need for redundant paths – new opportunities for redundancy are now presenting themselves.

Longer term, the best way to enhance competition and stimulate additional investment by the telecommunications companies is to increase demand for bandwidth. This can be done in multiple ways, but the simplest is to begin an education and marketing program to encourage businesses to learn about how advanced telecommunications services can benefit their businesses bottom line. The Downtown Lincoln Association for example has an annual technology fair, and more kinds of programs like this should be offered.

Also, local businesses and government agencies should develop high-value applications that are sought by the business community and residents to encourage the usage and adoption of new services. For example, the City and County could collaborate on a government portal developed to serve businesses needs. Permits, licenses, purchasing and other applications can be developed to target businesses and encourage smaller businesses in particular to get connected. Lastly, the community can pursue the incubation of technology, information technology, and electronics companies in Lincoln who have a demand for significant connections to the network. Simply put, Lincoln must adopt strategies that will improve the overall market for the provision of telecommunication services.

## **Networked Places, Applications, and Services**

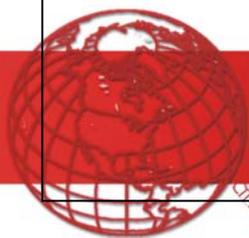
### Background

Why is this important? *A National Perspective.*

It isn't enough to wire the streets; it is also important to wire our offices, factories, schools, libraries and homes. Sometimes called Intranets, these networks are for internal communications, allowing employees to get e-mail, share printers, and connect to administrative services. Wireless access is needed for mobile workers — for convenience, and as a backup network in case there are problems with a wire line system.

#### **Applications and services provide value to users.**

Applications allow community members to administer benefits plans from home, take advanced classes at home or work, check on the school lunch menu for children, get building permits without having to drive to local permitting offices, and buy goods (ranging from electronic components to groceries).



While the Internet allows us to connect with the entire world, most people prefer to deal with local merchants and service providers. Most of our friends, teachers, and associates live within a few miles, and dealing with local government, by definition, a local matter. Because there are few local services on the Internet, many people see no reason to get connected. To attract these people onto the Net and to help them participate in the New Economy, every community needs to increase the number and range of local services.

Networked places, applications, and services include: businesses, the real estate community, schools and libraries, community-based organizations, health care and government.

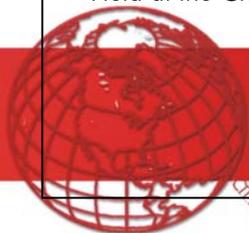
At the Connecting Lincoln Workshop<sup>44</sup>, participants assessed how well each of our sectors is wired and using network-based services and applications. This section outlines each of the economic sector groups that participated in the workshop.

The first part of the summary for each economic sector group explains the general issues facing the sector from a national perspective, followed by a status report for the City of Lincoln, including specific and detailed narration of actual case studies for each sector. The following economic sector groups are discussed:

- Business
- Community-Based Organizations
- Government
- Healthcare
- Higher Education
- K-12 Education
- Libraries

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<sup>44</sup> Held at the Champions' Club at UNL on January 8, 2001



## Business



Participants at the workshop ranked Lincoln's Business Community at a Stage 2.

### Lincoln's Business Vision:

Advanced communications services will increase visibility of local industry; open larger markets for goods and services; increase internal efficiencies and thereby improve profitability; and foster associative of our community with target or preferred businesses of a new economy.

Why is this important? *A National Perspective.*

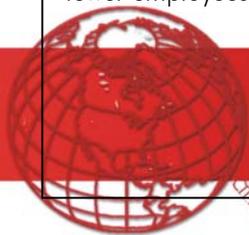
A number of factors are forcing businesses to change time-honored models of operation, i.e., there is now global competition, a trend towards partnering for all but core functions and a demand for more personalized services -- all in light of the falling costs of technology. Larger businesses must get connected as their customers and suppliers cut costs and refuse to accept paper orders or invoices. Businesses cannot be sheltered from competitors on the Web; Amazon.com has put significant pressure on local bookstores, travel agents are competing with firms like Travelocity and Orbitz, and car dealers compete with companies like Autobytel. Our businesses have to adapt; they have to learn the tools of the networked economy and use them in innovative ways to survive. A community's telecommunications infrastructure is an essential ingredient for success in the New Economy. In Lincoln, it is critically important.

How Are We Doing?

The Lincoln business community is made up of 7,800 of businesses.<sup>45</sup> The University has a positive influence on business formation and is beginning to play a more significant role. One of the Lincoln business community's most significant opportunities is to better support and leverage ongoing University related programs in software research and development, electronics, and biotechnology.

Several business groups were represented at the assessment workshop, such as software companies, electronics companies, biotechnology companies, and general

<sup>45</sup> In 1999, Lancaster County had 6,894 total business establishments. Of those, 5,810 had 19 or fewer employees.



business. The consensus of the business community at the workshop is that it is time to step forward and support Lincoln's recent efforts to assess and develop a competitive advantage in attracting key targeted industries.

Participants at the workshop reported that 30% of those currently employed in Lincoln have access to always-on connections to the Internet. 50% of all employees have e-mail accounts. In the case of mobile employees, 50% have wireless devices. Additionally, 10% of Lincoln's workforce participates in training/education programs either online or in person every 5 years

In terms of business functions and interaction on-line, workshop participants reported that 10% of businesses in Lincoln order goods online, transact with customers online, and manage HR/administrative information online. With respect to utilizing the Internet for recruitment purposes, 10% of employers post job openings on online job listing services such as [www.lincolnjobs.com](http://www.lincolnjobs.com).

### **Colby Ridge Popcorn**

Colby Ridge has been popping popcorn in Lincoln, Nebraska since 1983. The company grew out of the Original Corn Popper in downtown Lincoln that was opened in 1931. Three years ago, they had one phone line supporting the credit card machine, the fax machine, the UPS mailing machine, and the dial-up modem. At that time, they had two full-time production employees and a simple web site that produced 30 orders in the month of December.

Today, technology has transformed their wholesale business into a 7-man operation with four computers with always-on connections (using RoadRunner by Time Warner -- Prior to their current cable modem connection, Colby Ridge had a DSL connection through ALLTEL, but found the service to be unreliable). Additionally, their updated interactive web site produced 700 orders this past December as well as hundreds of requests for additional information. To remain competitive, they answer online inquiries and orders almost all day long, making reliability a critical component.

Their clientele, including Victoria Secrets, First Data Resources, and Norvo Nordisk Pharmaceuticals, reaches to all 50 states. In the last three years, the company's business has increased by 123% -- they credit that growth to their use of technology.

### **Downtown Lincoln Association**

The Downtown Lincoln Association (DLA) is working closely with its members to develop the core downtown area into a thriving location for technology-based businesses. The DLA organizes an annual Technology Fair designed as part marketing event, part learning event, and part networking event for businesses interested in technology. An impressive array of local supporters assists in the event. The local paper is a sponsor and helps widely promote the event to the community. In



2001, the Technology Fair offered courses on making your office “e-smart”, tours of technology businesses, a business expo and more. The Technology Fair partners with the Lincoln Public School District and University. For example, Fair attendees were provided information about the public school district’s “Technology High School” and about research and development happening on the University campus.

The DLA is also educating local businesses about the importance and potential of downtowns in the New Economy. In their newsletter, they feature articles about businesses that are getting “connected”, highlight and promote downtown high-tech businesses, and print success stories of businesses using technology to improve their bottom line.

### **Lincoln Technology Park**

Constructed in 1997, the Park is a statewide project of the University of Nebraska, the public/private sector and the University of Nebraska Foundation. The Park is a 130-acre high amenity, master-planned development. It is located on rolling wooded terrain with natural ponds, in the rapidly growing Highlands area of northwest Lincoln. It is adjacent to Interstate 80, and five minutes from the University of Nebraska-Lincoln campuses, downtown and the Lincoln Municipal Airport.

#### **Advantages enjoyed by tenants in Tech Park include:**

- The ability to locate in close proximity to like-minded companies who are involved in the development or utilization of new and evolving technologies, fostering unique opportunities for positive interaction;
- The University of Nebraska has made a commitment to providing enhanced access for Park tenants to the resources available throughout the University system;
- Assistance is available on site for technology transfer applications and enhanced research funding through the Nebraska Technology Development Corporation and the University of Nebraska Technology Transfer Office;
- The property provides a campus setting at a highly competitive price because land pricing is comparable to higher amenity industrial property and below market for higher end office applications;
- The Park provides tenants with access to shared services and amenities which will include video-conference facilities, multi-media meeting rooms, product display areas, showers and hiker/biker trails connected with the city-wide trails system;
- By retaining ownership of the land through long term leases, the Limited Liability Company is in a position to ensure the long term value of investments made by companies through enforcement of covenants and restrictions;
- An innovative Master Use Permit was issued for the entire Technology Park, allowing companies, which comply with the Use Permit and Covenants requirements to be issued building permits within 45 days of application.



Developments undertaken in the Park will have access to expedited permitting through the City of Lincoln;

- The Park is strategically located adjacent to I-80 with two separate interchanges within three miles, via Superior Street and I-80 or NW 12<sup>th</sup> Street. The Park is within three miles of either the commercial or general aviation terminals at Lincoln Municipal Airport;
- The Park is also located within the Highlands, a planned community which contains a cross section of housing opportunities, schools, and a new \$4 million City golf course which opened for play in 1995. Downtown Lincoln is within a five-minute drive of the Park, as are the Historic Haymarket area of shops and restaurants, both main and East campuses of the University of Nebraska-Lincoln, and commercial centers at North 27th Street and NW 12th Street.

The Park has an advanced telecommunications network in place, a Looped fiber optic system with an OC 12<sup>46</sup> connection to the network. The Park is seeking a redundant path to the network for its clients who require mission critical, always-on access.

The Park was formed in 1997. Since then, 21 businesses have utilized its resources. Seven companies have “graduated” and left the Park to operate their business; of those seven companies, two have left the Lincoln area. Another sign of the Park’s success is that it currently has a waiting list of five companies who are seeking access.

Even with the Park’s significant successes since 1997, the future is uncertain. The University Foundation has provided the financial resources for the Park to this point. Longer term, there has to be private financial support to make the Park realize its full economic potential.

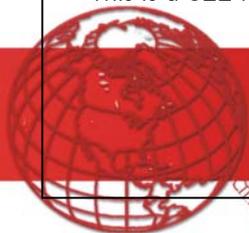
### **Nebraska Center for Excellence in Electronics (NCEE)**

The Nebraska Center for Excellence in Electronics is strategically located at the Lincoln Technology Park.

#### What is NCEE?

- State of the art electronics compliance testing laboratory covering emissions and environmental certifications.
- Training Center for board layout and surface mount manufacturing.
- Product development support facility for high technology entrepreneurs.
- University of Nebraska research extension.
- Southeast Community College electronics and CAD education satellite.
- The regions only independently operated 10-meter anechoic chamber.
- A cooperative partnership between government, higher education and industry.

<sup>46</sup> This is a 622 mbps connection.



The concept of the center began as a grass roots effort of Nebraska's Technology companies through partnership with first the City of Lincoln and then the State of Nebraska. It is now a non-profit corporation that operates in cooperation with Southeast Community College. Significant milestones:

- 1997 – Nebraska Technology companies cooperated with the Lincoln Partnership for Economic Development and formed the concept of NCEE. This ad-hoc team created a business plan, incorporated the center and began enlisting memberships and prepaid service agreements among technology companies.
- 1998 – Nebraska Unicameral and Governor provided capital funding to build and equip the NCEE. The bill, LB1173, as approved by the Nebraska unicameral and signed by the Governor, provided a total of \$5 million for the creation of the center.
- 1999 – Dennis Lyons Architects designed the NCEE building and construction began just west of the Technology Development Center in the University of Nebraska Technology Park.
- 2000 – The facility was completed
- 2001 - Grand Opening and Open house occurred on April 16th.

### Capital Formation

Access to angel investors and venture capital is an essential ingredient in the development of technology-based businesses. In Lincoln, there is a local group working to link entrepreneurs and financiers together to promote business formation in the community. The Nebraska Enterprise Forum organized in 1998. Since then, the Forum has been responsible for the financing of four businesses. The group meets monthly to help entrepreneurs develop and refine business plans, develop presentations to potential funders, and ultimately link business opportunities with investors.

Accessing capital in the formation of a business is critical, a significant challenge for Lincoln is strengthening its efforts to line up investors with entrepreneurs. Historically, the Midwest has had the fewest IPO's in the nation and lowest number of venture capital deals with local firms. This trend is continuing into 2002 as well.<sup>47</sup> While it may be more challenging to raise capital in the Midwest, that simply means more effort by the community is required to identify potential funding sources.

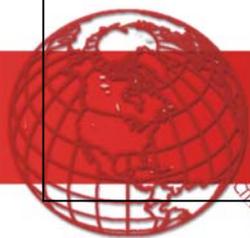
### Local Jobs Portal

Linclonjobs.com is an example of a locally developed application that provides high-value. The web site is sponsored by the Lincoln Partnership for Economic Development and has numerous features and functionality built into the system for job

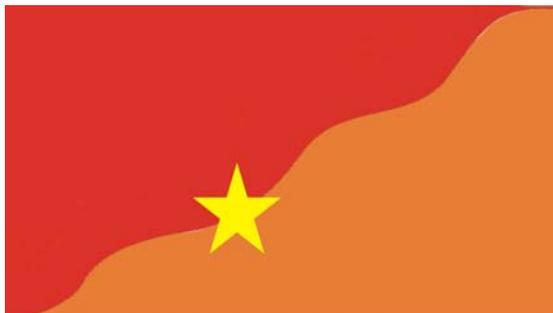
<sup>47</sup>Source: IPO.com.



seekers and employers. This web site can play a role in helping to market Lincoln as a high tech employment center.



## Community-Based Organizations



Participants at the workshop ranked the Community-Based Organizations at a Stage 2.

### Lincoln's Community-Based Organization

**Vision:** We will improve internal efficiency and external effectiveness through building community access and organizational technology capabilities. We will continue to build community access and develop programs internally and on the Internet to improve Internet efficiency and external effectiveness. Connect, connect, connect.

#### Why Is This Important? A National Perspective.

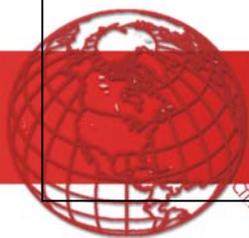
Our non-profit agencies provide a wide variety of services to the community, including health services, religious services, children's sports and public entertainment. Like any organization, community-based organizations need information technology to manage operations, apply for grants, reduce costs and improve client services. Their budgets are always tight, and many times they depend on out-dated, cast-off computers and donated services. CBOs generally don't have the time or money to train staff, create web sites, or take advantage of high-speed services.

#### How Are We Doing?

The community-based organizations in Lincoln are more sophisticated in terms of technology than many of their counterparts across the country. There are several funding agencies, like the Woods Charitable Organization and the Community Health Endowment, that have prioritized making technology a feasible asset to human service organizations. Web portals are being developed, and databases are being connected.

Over 20 Community-based Organizations in the City of Lincoln provide computer and Internet access to the community. Some like the Lincoln Action Program, the Salvation Army, and the Senior Center are providing training and computer/Internet access not only to their patrons, but also to the community.

Participants at the workshop reported that 50% of CBOs with at least 5 paid staff have at least one computer for every 3 employees. Additionally, 50% of community-based organizations have an informational web site. In terms of employee usage, it was reported that 25% of all CBOs have an e-mail account.



## Community Health Endowment

Community Health Endowment's mission is to make Lincoln the Healthiest community in the nation. With that being the goal, Health Technology is one of five (5) priority areas for the Board of Directors. The Health Technology goal is to provide leadership and vision by enhancing technologies that will interface health providers, increase availability of health information to the community and improve the collection and analyses of community data to better target public health policy and resources.

One example of a project currently being funded under the Health Technology category is the Health and Human Services Information Project. Funded in July of 2001, this project seeks to create a web portal in partnership with Lincoln Lancaster county Health Department to provide a common place for shared reports, studies, and databases.

Even though health technology as a whole has the fewest grant applications and fewest dollars awarded, it remains a priority area to the Endowment. They expressed a desire to see more applications, learn more about the technology needs of the community, and to play a pivotal role in helping the community move forward.

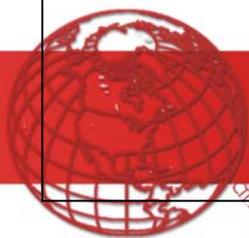
## Senior Citizen Center

The Golden Opportunities for Active Learning (GOAL) Computer Learning Center is a program geared towards teaching computer skills to the retired population of Lincoln. A combined pool of paid staff, community volunteers, and high school students staff the Center. The facility currently has a total of 14 computers divided between two computer centers. These classes range in cost from \$47.00 to \$67.00, which includes use of the computer facility and course materials.

The program has experienced a steady demand for all of their four courses: Intro to Computers, Advanced Computers, Beginning Computer Review, and Internet and e-mail. Because it is the most popular class, Internet and e-mail has expanded to include instruction on the use of scanners and web cams. Demand has been so great that they continue to add classes and to expand their coursework materials.

Additionally, the Senior Center offers public access computers at the downtown senior center. With the goal of four machines (they currently have two) by the end of spring, these computers are available the hours that the senior center is open.

Another program, Workable Solutions, aims to retrain senior citizens for re-entry into the workforce. This is a joint program including Operation Able, GOAL, Doan College, State Farm, Technology Management Incorporated, and Bryan LGH. Each course is designed to give twelve students competitive skills in all of the Microsoft Office applications.



## Human Services Federation

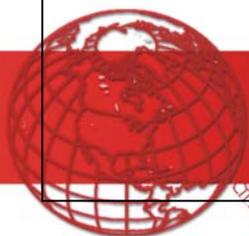
The Woods Charitable Foundation has allocated a half a million dollars to be given over a three-year period to help bring human services organizations into the New Economy. To do so, they created the Human Services Federation to serve as the allocation entity to: 1) provide hardware to human services agencies, and 2) to provide computer training to those organizations.

The Foundation seeks to help get to a common technology level so they can communicate with each other via the Internet. Software applications training is also a priority, as are web-based informational databases. The grant helps maintain the IriS database, which can do basic client tracking and reporting (goal is to be able to transfer consistent information back and forth between agencies). The Foundation funds training at the Goodwill Industries and Lincoln Action Program – both have labs on site and offer training to clients.

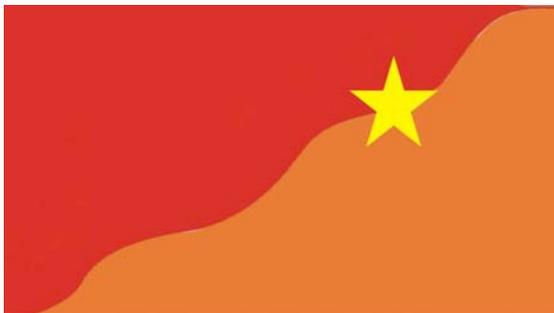
55% of the funding so far has been allocated to sub-grants for upgrade hardware, software, and training. Additionally, they have financed the licensing of 31 IriS sites (info and referral databases). Agencies don't have to be a member of the Foundation to receive funding.

The third phase of this program will start March 1<sup>st</sup> of this year. At the end of this phase, it is predicted that 75-80% of human services organizations will have access to IriS, usage of web sites, and access to information. At that time, the goal is for most of the agencies to be self-sufficient.

**Community Service Implementation Plan (CSIP)** was formed when the City-County joint budget committee and United Way performed a study on community services in 1999-2000 and generated a list of nine priority areas. University of Nebraska Public Policy Group aided in developing a community process/plan. Seven working coalitions were formed to take recommendations and build action plan for implementation. Though not originally identified as one of the seven coalitions, a technology group is emerging. A need to identify common systems, to formulate an information gathering process, and a need for HIPPA guidance is driving the group.



## Education



1 2 3 4  
Participants at the workshop ranked Education at a Stage 3.

### Lincoln's Education Vision:

*Schools will use the network to connect students, teachers, and parents, improve learning using online resources, and manage administrative responsibilities more efficiently.*

Why is this important? A National Perspective.

For our children to succeed in the New Economy, the tools of the Information Age should be as comfortable to use as pencil and paper. The future health of the Nation's economy depends on how broadly and deeply we reach a new level of literacy – that includes strong academic skills, thinking, reasoning, teamwork skills, and proficiency in using technology. Our schools can provide every student, regardless of family income, with the opportunity to understand these tools. Equally important is the use of these tools in the education process itself. The interactive nature of the Web is providing a richer learning experience that engages and motivates students to explore and learn.

How Are We Doing?

One of Lincoln's strategic advantages is its K-12 system and the University. Not only does the District produce exceptional students, it also takes technology deployment and education seriously. The District has developed several important programs to further provide educational opportunities for students and faculty and is constructing a state-of-the-art fiber optic network. The University plays an essential role in Lincoln and is an attraction and asset for the City to market.

Lincoln Public School System initiates a survey of parents every year to determine computer and Internet usage at home. Since 1990, the percentage of computers in the home has increased 59%.

K-12 participants at the workshop reported that 75% of classrooms have always-on connections to the Internet and 100% of students have and use e-mail accounts. Some public ports and terminals are available in common areas of schools



Additionally, 25% of schools in Lincoln have an interactive website including access to homework assignments and communication with teachers and administrators. 50% of teachers are trained to use the Internet for instruction

Higher Ed participants reported that 100% of dorm rooms have always-on connection to the Internet. 50% of campuses have a wireless network, as well as 50% who offer online registration.

50% of higher education faculty/instructors in Lincoln are trained to use the Internet for instruction, and 50% of classes use digital content and/or Web-based content for instruction.

## **K-12**

### **Lincoln Public Schools (LPS)**

LPS reports that each school has Frame Relay T-1 that is aggregated into one of six T-1s connected to the District office. The District Office has 6 Mbps Internet service via Transparent LAN Interconnect Service (TLIS) with ALLTEL. Wireless technology is being utilized to connect Lincoln High to three special interest schools: the Zoo School (Science), Arts and Humanities, and the Internet Technology Focus Program (ITFP). All schools (58) and administrative locations (3) have Internet access indirectly through the District Office.

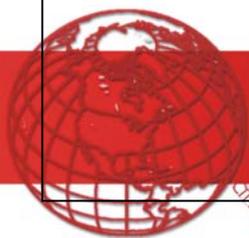
Since 1997, all classrooms have at least two LAN drops. District wide, there are approximately 6,000 computers for student use, and an additional 1,000 for administrative use, fostering a 5/1 computer to student ratio throughout the district.

The District is in the process of collaboration with Aquila to construct an 80-mile fiber optic network connecting 59 sites. The network is a hybrid fiber coax design. The District has invested in wiring its classrooms and is using it for their voice and data traffic.

LPS is an Educational Service Unit, which means that they are required to provide Internet service for other schools in their area. Additionally, they provide the technical support for equipment upkeep.

Technology training is available to all instructors. \$2 million in grant money has been awarded over the past 6 years to cover the fees for classroom equipment, training, and stipends. One-third of all training in LPS is related to tech training, which results in approximately nine hours per teacher per year.

LPS has formalized requirements for student curriculum at every level. Keyboarding, word processing, and beginning multimedia skills are taught at the elementary level. At the middle schools, Exploratory Computer Applications is required, while other



multimedia electives are available. High school has a requirement of 10 credits (two classes), including the required Computer Applications in Microsoft Office and several other electives.

Less than one year ago, the Information Technology Focus Program was established as a component of the Lincoln Public Schools Instructional Technology Academy. Students choose to participate in ITFP based on an interest in technology. This program was developed to provide a comprehensive and articulated information technology program that emphasizes the high school student as a knowledge worker – a person who can use the computer to design, develop, troubleshoot, program, and publish.

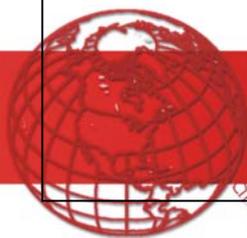
It is a specialized computer school targeted at students who excel at or are interested in computer technology. This program is less than one year old and seeks to partner with the community through outside speakers and clients.

ITFP students will develop technology skills in one or more of the following areas: interactive media, web page development, networking and programming languages. Courses include: Advanced Web Page Development, Advanced Interactive Media, Advanced Interactive Media II, Cisco Networking, and Advanced Programming Languages. The students will also have opportunities to make connections between their course work and the “real world” by participating in an LPS internship or a business mentorship program.

In addition to ITFP, LPS provides a Summer Technology Program. This is a hands-on computer experience in video production, animation, web design, and robotics programming will be offered for students entering fifth through eighth grades next school year. The goal of this program is to provide upper elementary and middle school students an opportunity to explore interest in computers and technology.

### **Saratoga Elementary School**

Saratoga Elementary School is in its second year of participating in the 21<sup>st</sup> Century Community Learning Center Grant sponsored by the Federal Department of Education. This three-year grant seeks to develop a partnerships between family service agencies, private partners, and schools to provide improves student and adult learning opportunities in the schools. As part of the program, Saratoga offers evening adult computer training classes intended to aide senior citizens and adult community members in becoming computer literate and to help them learn how to use e-mail. These four-week sessions include five adult participants consisting mainly of parents and grandparents of elementary students. Later this school year, the school media center will be open to families during another 4-week session.



## **Lincoln East High School**

The Microtech Computer Club has been working with the GOAL Learning Center at the Downtown Senior Center since 1990. Students update machines, hardware and software configurations, and occasionally teach classes. Additionally, students set up several computer stations at the Senior Festival at the Nebraska State Fairgrounds this past year to provide demonstrations.

## **Catholic Diocese of Lincoln**

The Catholic Diocese of Lincoln serves 4,102 students throughout ten K-8 schools (Blessed Sacrament, Cathedral of the Risen Christ, North American Martyrs, Sacred Heart, St. John, St. Joseph, St. Mary, St. Patrick, St. Peter, St. Teresa), and one high school (Pius X). There is a 9/1 computer to student ratio at Pius, and a 5/1 ratio at the elementary schools.

70% of the high school teachers at Pius X utilizes a software program called SASI (School Administration Student Information) that provides timely information to parents who want to receive information via e-mail or (ParentConnect) web browser. This password-protected program allows parents to log on to their own account that is integrated with real-time grading information. One downfall of the program is that there are homes where parents don't have connectivity.

There is a Technology Initiative for entire Lincoln Diocese, including 31 schools south of Platte River. They have just completed the first phase of the program, which established computer labs in every school and provided one Internet hook up per classroom. Phase two will provide for two computers in each classroom, and connect 31 schools on a proprietary network. A potential Phase III of the program may involve community initiatives.

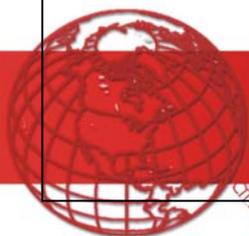
In Lincoln, there are two T-1 lines to a central location for the diocese, and all schools are connected by tier 3 DSL (1.2 megabit). Most elementary schools have a 384 kbps DSL Tier 1 connection, though some have 768 kbps connections. There are two Internet drops per classroom. Every school has two direct instruction computer labs (30 computers each) wired with 35 connections to Internet. In addition to their own direct instruction computer labs, the high school has two general use labs for a total of four computer labs.

Each school in the diocese has it's own tech committee and support staff. Teacher training is a resource issue.

## **Higher Education**

### **UNL Computer Sciences**

The research agenda for the Department of Computer Sciences is to pursue a set of coordinated activities for UNL to become a leader in research and education in



making pervasive computing a reality. With 17 faculty members and 798 students from undergraduate to PhD. levels, the Department conducts leading research in the areas of component software technology, knowledge management in software engineering, software quality, and distributed software systems. Faculty members at UNL are developing component-based technologies and knowledge management techniques for developing better software faster. Additionally, research at UNL is developing new Internet-based software architectures with scalable network server-clusters that distribute to improve web application performance. These research activities span various disciplinary areas to improve software development tools and methods for the next generation software applications and will have a direct impact when transferred to the regional economy. Other tools of innovation are underway, including the Great Plains Software Technology Initiative, the Prairie Fire Computer, and the J.D. Edwards Honors Program.

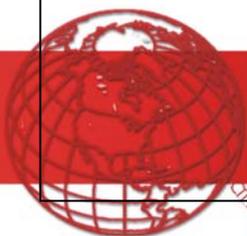
### The Tools of Innovation at UNL

#### The Great Plains Software Technology Initiative

UNL has been successful in receiving funding for the Great Plains Software Technology Initiative to lead the development and dissemination of technologies to promote and advance the regional software industry. As case studies of successful “smart communities” clearly demonstrate, a research university is an important core element of the foundation for developing a vibrant and innovative software industry. The Initiative will work with a consortium of university, industry, and government; to accelerate economic development of software related industries in the region with three main missions.

**Economic Development.** The Initiative will stimulate economic development in the region by providing innovative solutions needed to compete in the national and international marketplace. Economic development will be enhanced by: (a) attracting new software development and IT companies eager to take advantage of the University’s expertise and the pool of potential excellent employees, (b) identifying technologies with commercial potential, (c) providing visibility to existing software development and IT companies, (d) sharing development costs for solutions that can be used to stimulate growth among consortium members, and (e) facilitating the exchange of successful tools and methodologies amortizing the learning cost of their use and implementation.

**Education and Training.** A major emphasis of the Initiative will be to help stem the region’s “brain drain” of good students leaving the state. Students will be provided with challenging internships during their education to match them with high-paying and stimulating jobs in the region, and to facilitate the transition to regional industry. The Initiative also will provide continuing education through classes and seminars that train IT workers in this rapidly changing field. The prestigious JD Edwards Honors Program (JDEHP) already is aligned to support this educational effort.



**Research and Technology Transfer.** The Initiative will help bridge the needs of industry with University researchers capable of creating state-of-the-art solutions. Efforts will focus on software development methodologies and tools that accelerate the development cycle and improve software quality. For example, new techniques will be developed for handling server overload, improving web performance, and providing an edge for the regional e-businesses. Another example is the creation of software components to serve as building blocks that can be reused by the regional industry to produce larger systems, leading to shorter time to market. The Initiative will provide initial seed funds to stimulate the collaboration process and to transfer the most promising technologies to the local industry. It will also host a repository of tools, methods, and case studies for consortium members to use.

### The Prairie Fire Supercomputer

The University has been successful in securing funds for the 100<sup>th</sup> fastest computer in the world to be adjacent to the UNL campus. The \$450,000 computer dubbed the Prairie Fire Supercomputer will allow many new capabilities for the UNL faculty and staff and serve as a magnet for computer science students and engineers into UNL's programs. New research and development capabilities enabled by the new computing power will positively effect the formation of local software development and testing in the City.

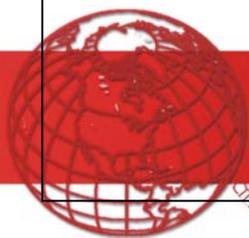
### JD Edwards Program (JDEHP)

The J.D. Edwards Honors Program accomplishes its mission through programs for three different academic levels.

The Undergraduate Program targets high-ability high school graduates with proven leadership skills and technical aptitude. Graduates of this program will be ready to meet the challenges of business in the 21st century as multifaceted leaders able to unite people, processes, and technology for a competitive edge.

Also offered by JDEHP are two Masters degree programs. The MBA in Information and Software Systems program integrates two interdependent fields, computer science and business management, to give graduates the ability to think strategically about technology across a company. The curriculum combines courses in finance, accounting, economics, marketing, and management with courses in software development and programming.

The Master of Engineering in Software Engineering prepares you for advanced professional practice as a software engineer. This is achieved through classroom, laboratory and studio experience involving both software engineering and business topics. Flexibility within the masters program allows students to pursue a variety of related topics such as database and information systems, human-computer interaction, computer networking, distributed systems, information integrity and security, and entrepreneurship.



The first graduates of the program will be in 2002. A key challenge will be trying to retain the talent developed in this program by placing graduates in local companies. A significant percent of students leaving the UNL computer sciences and engineering students move to out-of-state locations for employment. It was noted that few students have an understanding of local opportunities.<sup>48</sup>

Culminating all these activities at the Computer Science Department is a futuristic technology plan for downtown Lincoln. A long-term goal is to provide the infrastructure in downtown Lincoln that will enable pervasive and real-time collaborative computing. Use of the skywalks to provide a high-speed optical communications infrastructure, implementing wireless networking, and J.D. Edwards student involvement are possibilities under consideration.

Community businesses are taking advantage of the JD Edwards program to enrich their technology. LES, for example, is working with JDEHP to develop a software interface between its financial system and other systems to fully automate processes.

#### Internet 2

Internet2 is a consortium being led by over 180 universities working in partnership with industry and government to develop and deploy advanced network applications and technologies, accelerating the creation of tomorrow's Internet. Internet2 is recreating the partnership among academia, industry and government that fostered today's Internet in its infancy. The primary goals of Internet2 are to:

- Create a leading edge network capability for the national research community
- Enable revolutionary Internet applications
- Ensure the rapid transfer of new network services and applications to the broader Internet community.

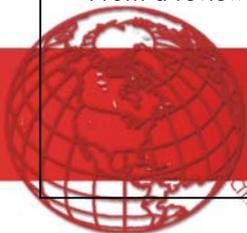
The University's participation in Internet 2 is an important overall indicator of its desire to maintain cutting edge research and development initiatives. More marketing of the programs and opportunities associated with I2 need to be developed.

#### UNL Division of Continuing Studies

All programs for the UNL Division of Continuing Studies started out on television through a direct TV satellite owned by the state. Now the curriculum ranges from direct TV via satellite, computer-based education, CD-rom technology, and video and audiotapes.

Nebraska Corp Net is a program involving approximately 45 companies in the state of Nebraska and abroad who have equipped a down link classroom onsite that is used to deliver graduate credit programming to employees in engineering, business,

<sup>48</sup> From a review of data on graduates to the computer sciences and engineering programs.



and journalism. Corporate training for specialized subject matter is available on-site and at a distance. Companies involved in the program include: Cabalas, Duncan Aviation, and the National Rural Electric Cooperative Association.

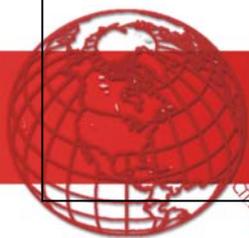
Currently, the University offers a master of education and three PhD programs on the web.

### *UNL-College of Business Administration (CBA)*

The New Horizons program for CBA was adopted by the Dean's Office and implemented on July 1, 1995. New Horizons is a package of electronic products and services designed to facilitate maximum access to electronic information technologies by faculty, staff, and students throughout the College of Business Administration. The mission of New Horizons is to create a seamless link between the users of electronic information technologies and the tools necessary to meet their needs. New Horizons is being developed and managed by the Information Technology Services Team within the college and implemented and maintained under the supervision of a standing committee comprised of faculty, staff, and students of CBA.

Additionally, the College of Business Administration at UNL houses the Center for Entrepreneurship. This program includes a mentoring program, venture capital assistance, and field research opportunities in entrepreneurship.

One common problem surfaced at the University of Nebraska – there is no one single source for training at UNL. Division of Continuing Studies, CBA-Center for Entrepreneurial Studies, College of Agricultural, and others currently have are working on a variety of technology initiatives, but there is no communication/collaboration between them. The community knows that the university probably has the resources, but don't know how to access it.



## Government



Participants at the workshop ranked government at a Stage 2.

### Lincoln's Government Vision:

*It is government's vision to provide access to all government services, information and business transactions to citizens and other governments 24/7, and to break down jurisdictional barriers between governments and to foster a progressive climate for businesses and employees to create a competitive advantage.*

### Why Is This Important? A National Perspective.

Local governments provide communities with many services, and offer a great deal of information about the community. Businesses and residents want to have access to the information and services with the same convenience and ease of use as they would when ordering a book online. The network is also a convenient tool for expressing an opinion to elected officials, distributing Council and Commission agendas, reporting a problem, or getting information on planning and zoning questions. Local governments can serve as role models for the community: they encourage public access and show how valuable services can be delivered efficiently and conveniently on the Web.

### How Are We Doing?

As Lincoln's top ten ranking on the Digital Cities study points out, the government in Lincoln has made strides to provide services to its community members; it needs to continue to be aggressive in e-government deployment and collaborate with the State and County governments.

Participants at the workshop reported that 50% of government buildings have always-on connections to the Internet. 25% of governmental employees have e-mail accounts.

As for the community as a whole, workshop participants reported that 50% of all homes in Lincoln have a computer/access device. 30% of homes use the Internet.

### Lincoln Electric System

Lincoln Electric System (LES) provides electric services for the City of Lincoln and parts of the surrounding area. One of LES's core missions is to work to enhance Lincoln's



economic vitality. They principally do this by offering competitive rates for power. But, recently, LES has attempted to leverage its investment in its fiber optic network constructed in the mid-1990's to manage its electric system for use in helping businesses secure faster connections to the network.

LES's proposal was to use its dark<sup>49</sup> fiber optic cable to offer data services for large commercial customers. LES saw opportunities to use its network to provide services to two organizations: one that Lincoln was trying to retain, and one Lincoln was trying to attract. LES's plan to offer its network capacity to local businesses caught the attention of the Legislature who promptly passed legislation that essentially prohibits municipal electric utilities from entering the telecommunications market.

Before the legislation was passed, LES applied to the State to enter the telecommunications market in Lincoln and the application was denied. LES's has appealed the case, which is currently before the Nebraska Supreme Court. Local businesses and Internet Service Providers are in support of LES entering the market and this may continue to be a viable option for enhancing telecommunications services in the community pending the Court's ruling. Municipal electric utilities in many states are providing alternative competition for services in local markets.

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<sup>49</sup> Dark fiber refers to unused, or unlit fiber.



## Healthcare



Participants at the workshop ranked healthcare at a Stage 2.

### Lincoln's Healthcare Vision:

Healthcare shall have continuous access to cost effective, secure network statewide.

Why is this important? A National Perspective.

The healthcare industry is highly information-intensive. Doctors have to keep up with the latest research, patient records have to be easily accessible and accurate, and images, test results and prescriptions have to be delivered promptly, without errors, to practitioners, pharmacies and insurance providers. Errors and delays can be costly and dangerous, so many providers are converting to electronic medical records, which can be easily updated and shared on secure, internal networks. Network-based technologies like videoconferencing and digital stethoscopes allow specialists to consult with rural patients, reducing travel time and hazards.

How Are We Doing?

The hospitals in Lincoln are utilizing technology to transform their business. They're connecting their facilities, their doctors, and their patients. Madonna Rehabilitation Hospital, for instance, is about to become the only comprehensive telehealth provider in the nation.

Participants from the Healthcare Sector reported that 25% of providers have always-on connections to the Internet and 50% of health care providers have e-mail accounts for external communication. Additionally, 10% of providers have informational websites.

### Bryan LGH

A private high bandwidth SONET network links all Bryan LGH campuses. Bryan just starting to use electronic radiology imaging instead of film so images can move more quickly over its network improving access to information for doctors. Five locations in Lincoln, and several others throughout the state are web enabled to connect to a mutual network. This is a 585-bed hospital.



Bryan LGH participates in the Heart and Health Alliance, a 32 hospital network with ultimate goal of being connected to share education and data. Additionally, they recently entered into a joint venture with City of Crete, to build a new hospital with complete connectivity. The biggest challenge in both of these endeavors is finding cost effective connectivity in rural Nebraska.

Bryan LGH sites affordable connectivity as a challenge, especially for communities in the western part of the state. Many small town health centers simply cannot afford the connections and opt not to participate.

All medical facilities in the Lancaster Medical Society have been in a collaborative effort to develop an Internet based clinical informational access system for physician access. Most physicians are using dial-up modems from their homes.

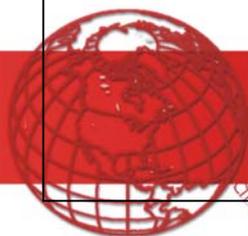
### **Madonna Rehabilitation Hospital**

Madonna Rehabilitation Hospital is a regional provider of long-term care and is a nursing home facility that has served 28 states in the past five years. It was one of the first assisted living facilities for adolescents in the country. Facilities for Madonna include one hospital (250 beds), one outpatient clinic in Lincoln, and one occupational health clinic. There are ISDN lines from main campus to the occupational health site.

Madonna has recently received \$306,000 in federal grant money to make them the first in the nation to provide comprehensive rehabilitation services over the Internet.

This telehealth program will involve video conferencing or video streaming to provide a myriad of services including: continuing education for health professionals, speech therapy, physical therapy, occupational therapy, wheel chair seating and positing therapy, assisted technology (how to turn the pages on a book), augmentative communication (devices to point and speak), neuro psychology, psychiatry (physical medicine and rehab).

The telehealth program will utilize a fiber route to a school consortium (70+ schools in NE), which will include point-to-point T-1 lines. High monthly tariff costs are creating a serious challenge to the program; there is fiber available in rural Nebraska, but there are not access points to most communities.



## Libraries



Participants at the workshop ranked libraries at a Stage 2.

### Lincoln's Library Vision:

To provide a virtual library of the world's information with unlimited, high-speed access to everyone at any time.

Why is this important? *A National Perspective.*

Public libraries play a vital role in most communities by providing every resident with the opportunity to receive instruction and use the Internet for free. Libraries are not open 24 hours a day, however, so sometimes there are lines of people waiting to use the machines. Some people have been able to start businesses because of Internet access in libraries, and many K-12 students have come to depend on access to the libraries' computers to complete their homework assignments.

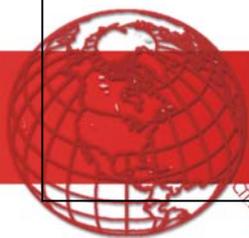
How Are We Doing?

The libraries in Lincoln are taking measures to move towards the New Economy. The library system at the University of Nebraska – Lincoln, for example, is installing wireless technology in their main branch, as well as finding innovative ways for patrons to access materials online. 100% of public libraries in Lincoln offer public access to the Internet as well as provide catalog searching on the Internet.

### University of Nebraska Libraries System

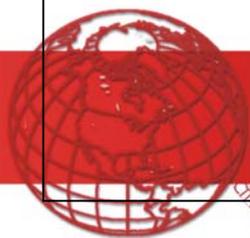
The University of Nebraska Library System has 10 facilities, two of which each have two general-purpose computer labs (30-40 machines a piece) for general use of library patrons. Additionally, there are hundreds of reference terminals throughout the library branches, each hooked up to an online system where users can access their borrowing records, check out books, and make article requests.

While each branch is wired to the University system, the Love Library on the main campus will be equipped with wireless technology at the end of their current renovation project.



Also of note is the inter-library loan system being used by the library. This national program recently adopted an online option where students, faculty, and staff can not only order their reference materials and articles online, they can also view the entire documents online.

Additionally, UNL's Library system offers a one-credit, web-based course that is mandatory for all freshman students. The coursework for this class includes Internet research skills. There are currently 42 library faculty members at UNL, each is trained to teach Internet research courses through the Distance Learning program – a program utilizing satellite technology to broadcast classes to other locations.



## Networked Economy

Why is this important? A National Perspective.

The New Economy is driven by innovation. New ideas move quickly from university research to the entrepreneur and venture capitalist. New business models are forcing old-line businesses to modify established ways of doing business, to cut prices and to improve services. Jobs are being transformed, and those with the right skills are earning salaries that were unimaginable a few years ago. And they are worth it. Information technology has accelerated productivity in the United States, but only in those organizations that are able to use it wisely.

The consumer has been the big winner in all this. Those with Internet connections, and the courage to try new tools, are getting discounted airline tickets, great deals on collectibles, free delivery of groceries, and access to information that used to be expensive or time-consuming to locate. Those without these skills, those on the other side of the digital divide, are in danger of falling behind in the competition for the better jobs.

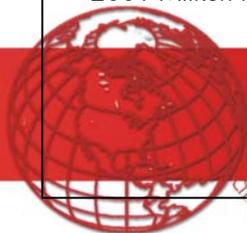
How is Lincoln doing?

Nebraska in general falls behind its peer states in key areas of innovation. One area where Nebraska rates highly is in University research and development. An opportunity for the University system is to develop a strategy to develop more federal and private research and development funding. Another strong area for Nebraska is its ability to create spin-off businesses from its research and development labs.

Benchmark Cities – Milken Institute New Economy Index<sup>50</sup>

Lincoln Nebraska	Boise Idaho	Boulder Colorado	Des Moines Iowa	Fort Collins Colorado	Kansas City Missouri	Madison Wisconsin	Omaha Nebraska
State Ranking							
40	29	3	38	3	28	31	40
Individual Community Rankings (out of 200)							
85	7	4	119	31	41	71	51

<sup>50</sup> 2001 Milken New Economy Index



State	<u>Ph.D. Scientists and Engineers in the Workforce</u>		<u>Science and Engineering Graduate Students</u>		<u>Computers in Households</u>		<u>University Research and Development</u>		<u>Federal Research and Development</u>	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Colorado	2	16	8242	15	62.6	4	123.6552	10	354.693	8
Idaho	0.4	40	1458	40	54.5	14	54.46432	44	160.3196	21
Iowa	0.8	28	4437	27	53.6	19	129.1731	5	92.02579	37
Missouri	1.7	19	5805	21	52.6	22	99.63941	21	169.8287	19
Nebraska	0.5	36	2375	35	48.5	34	123.265	11	56.47504	44
Wisconsin	1.5	21	7304	17	50.9	26	105.2952	19	71.95598	41

State	<u>Private Research and Development</u>		<u>Small Business Innovation Research Grants</u>		<u>Royalties and Licenses</u>		<u>Patents Issues</u>		<u>University Spin-outs</u>	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Colorado	1426.7	14	29.0152	3	1.86027	23	482.6492	10	0.09968	20
Idaho	1947.3	10	1.76116	40	0.22611	42	1247.341	1	0	39
Iowa	364.38	35	1.27457	44	3.51562	17	231.0065	26	0.10791	19
Missouri	504.1	31	1.45469	43	3.43287	18	173.1838	35	0.09176	25
Nebraska	201.12	43	1.07775	46	1.04018	31	174.1404	34	0.09738	21
Wisconsin	695.11	27	3.59448	26	6.60275	9	387.4209	13	0.09044	26

Source: CFED, 2001

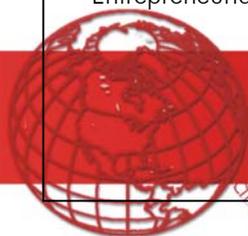
Workshop participants reported that 25% of the workforce participates in training/education programs either online or in person every 5 years. Additionally, 25% of employers post job openings on online job listing services.

### Enhancing Lincoln’s Innovation Capacity

The University of Nebraska Lincoln is a strategic asset of the community. The University is developing innovative programs in many of its departments and is seeking a stronger role in promoting local and regional economic development in Nebraska. So, how important are Universities in local economic development? A recent study of growing companies in Seattle found that 70% of them had a direct, active role in the University of Washington.<sup>51</sup>

There are strong signs that Lincoln is developing the infrastructure to promote innovation – the driving force of the New Economy. The University is re-committing to becoming a world-class research and development institution. This is important as many studies on the New Economy and successful communities have determined that

<sup>51</sup> Entrepreneurial Hot Spots, Cognetics, 2000.



proximity to and leveraging University R&D assets stimulates the local economy and attracts knowledge workers. Further, major innovations taking place at the University have the great potential to drive local economic development in software, information technology, and electronics. The Universities Prairie Computer, the JD Edwards program, Great Plains Software Technology Initiative, Nebraska Center for Entrepreneurship, Internet 2, R&D in wireless technologies, pervasive computing, and networks provide significant opportunities to commercialize new technologies, products, and approaches.

Then add to the mix the success of the Lincoln Technology Park and the Nebraska Center of for Excellence in Electronics, and some definite opportunities begin to take shape for the software development, electronics, and information technology-based businesses.

These initiatives on their own will produce value and results. These initiatives coordinated tightly with an aggressive economic development initiative can produce a very significant competitive advantage for Lincoln. Better coordinating these initiatives with the Lincoln Technology Park and the private sector is one of the most significant opportunities for the community.

### **The Lincoln Workforce**

Lincoln has a highly educated workforce – an important ingredient in being an attractive location for knowledge workers and New Economy businesses. High concentrations of knowledge workers in a community creates higher and faster growing per capita incomes.<sup>52</sup> In Lincoln, the top wage categories are in knowledge based industries (see appendix). Lincoln boasts higher concentrations of workers with four-year degrees and PhD's than the national average, giving it a strong foundation to support and develop knowledge based jobs.

### **Consumers Engaging Technology**

The Lincoln community is better connected than most other regions around the United States. Nationally, 56% of adults reported having Internet access.<sup>53</sup> In Lincoln, the estimates are that approximately 80% have access.<sup>54</sup> The community has made a significant commitment to creating access for those who do not have it. Libraries and non-profits have teamed up to provide multiple sites for community computer/Internet usage.

<sup>52</sup> Paul Gottlieb and Michael Fogarty, "Educational Attainment and Metropolitan Growth," Case Western Reserve University, 2000.

<sup>53</sup> Pew – The Internet and Life Project, Pew website.

<sup>54</sup> According to data collected by the Lincoln Public School System.



## Network World Enablers

Why is this important? A National Perspective.

Many of the barriers to connectivity are invisible. Some people avoid the Internet because they are worried about protecting their privacy, about break-ins, and about legal protections if something goes wrong. Policy makers overlook key issues that prevent progress, such as allowing digital signatures, or facilitating accelerated construction permits. Or the barrier might be as simple as not realizing that there is a free, high-speed computer in the library across the street, with librarians who are only too happy to help a novice get started.

Of the 44% of adult Americans who are not connected, at least half say the Net does not have any value for them.<sup>55</sup> Many of the holdouts are over 60 years old, and out of the workforce. But there is a substantial number of Americans of working age who can still be reached. We need to identify and remove the invisible barriers to connectivity — ignorance, privacy and security fears, points of access and public policy.

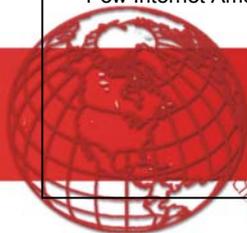
How is Lincoln doing?

Visitors to Lincoln can find fast connections to the network in several locations, at the Cornhusker Hotel through a wireless connection and at the local Kinko's (24 hours a day, 7 days a week) for example. The University is constructing wireless networks on campus to provide for seamless access to the network for students and faculty.

It was reported that there are not sufficient resources and training programs to help small businesses, community-based organizations, and others understand essential privacy and security issues. Businesses and organizations do not know there are free software packages for protecting their computers and networks from attacks and viruses for example.

It was reported that our community leaders in the public and private sectors are beginning to engage telecommunications and economic development issues. The strongest supporters of this initiative have come largely from the public sector, it was noted at the workshop that businesses have to step up their involvement in, and support for improving Lincoln's competitive position. Many business leaders at the workshop feel it is time to get involved, but would like more of a defined process with specific goals outlined to justify their involvement. Many don't fully understand the goals of the Technology Council and its mission.

<sup>55</sup> Pew Internet American Life survey, 1/2001



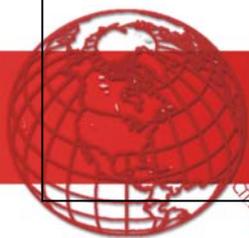
For the Connecting Lincoln Initiative to be successful long-term, more business involvement is required – the process cannot be solely government driven. The Chamber of Commerce and Partnership for Economic Development must play a key role in helping Lincoln become more competitive for New Economy businesses and jobs.

### **What needs to be done?**

All citizens should be able to find affordable access to the Internet in a secure, convenient location. Everyone should have a working understanding of security and privacy issues, and the skills to protect themselves and their enterprises.

- Organize seminars on the policy issues for policy makers and business leaders.
- Create more public access facilities with the help of private companies and community service organizations.

Encourage the local media to help businesses; policy makers and consumers understand their online risks as well as their rights.

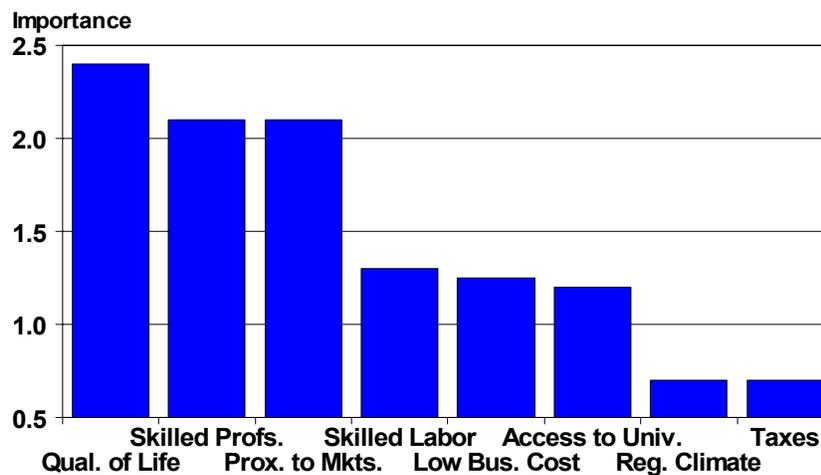


## Quality of Life

Why is this important? A National Perspective.

Because a skilled workforce is one of the most significant dimensions in a community that high-tech businesses are seeking, successful communities pay attention to quality of life issues. In many communities, traditional economic development strategic plans are being augmented to include bike paths, hiking paths, enhancements to arts and cultural programs, and others. Also important is a community's downtown and its offering of the kinds of amenities and experiences sought by younger technology workers. These include renovated downtown buildings, downtown lofts, outdoor restaurants, microbreweries, and live music. These characteristics are growing in importance for downtowns to address in the New Economy. The revitalization of downtown Denver is an excellent example of a community that has been successful.

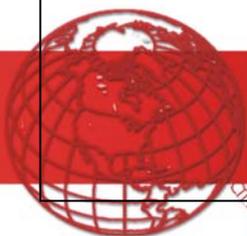
A recent Bank of Boston study of the factors that high-tech businesses considered when considering where to locate their business, the number one factor is quality of life.



Importance of Factors in Business Location (Bank of Boston)

How is Lincoln doing?

Workshop participants evaluated Lincoln's quality of life using a variety of evaluation criteria. In national rankings and in rankings with the peer communities, Lincoln rates highly. Lincoln is most competitive with its peer communities in the arts and lags somewhat in leisure ranking to all peer communities with the exception of Boulder and



Fort Collins who rank very highly due to the abundance of outdoor activities in the nearby Rockies.

Workshop participants confirmed that Lincoln has a high quality of life. The participants were asked to broadly rate the community in the following areas:

<b>Dimension</b>	<b>Rating<sup>56</sup></b>	<b>Notes:</b>
Environment	4	The community's dedication to protecting the environment is being re-affirmed in the new comprehensive plan.
Recreation	3+	There are ample recreation opportunities in the community – both publicly and privately provided.
Arts	3	The community offers a variety of entertainment alternatives to the community, including arts and theatre and minor league sporting events.
Urban Design	3+	There is a strongly defined downtown area in Lincoln – the new comprehensive plan is addressing ways to enhance the urban design.
Housing Affordability	4	The community offers a full range of housing options for residents.
Public Safety	3	Crime rates in the community are at or below statewide averages and there are ongoing programs designed to maintain a low crime rate.
Health Care	4-	Lincoln is home to world-class medical facilities that serve a large region of the State.
Collaboration	3	The public and private sectors are just beginning to collaborate on complex public policy issues, to this point; there has been some successes to build upon.
University	4-	The University is very integrated with the community. The University has a vision of how it can help support economic development.
Airport	1	The local airport offers limited direct flights to major markets.
K-12 System	4-	The school district is one of the top performing in the State. The education system is seen as a strong competitive advantage.

### What needs to be done?

Lincoln's quality of life offers a significant advantage to existing and potential businesses. The goal is to leverage existing community assets while further enhancing those characteristics that are important in business location decision-making.

<sup>56</sup> Stage 1 lowest – Stage 4 highest. These Quality of Life elements were added to the CSPP Assessment Tool.



## Appendix A - Community Workshop Summary Matrix<sup>57</sup>

#	Name	Score				1-Year Goal
		1	2	3	4	
<b>The Network (Infrastructure)</b>						
1	Residential			3+		4-
2	Commercial		2+			3-
3	Wired/Fixed Wireless		2			3
4	Mobile Wireless				4	4
<b>Networked Places (Access)</b>						
5	Business, Agriculture		2+			3-
6	Government	1+				2
7	K-12 Schools			3+		4
8	Higher Education			3		4
9	Libraries		2+			4
10	Healthcare		2			2
11	Community		2+			3-
12	Home		2			2+
13	Real Estate Development					
<b>Networked Applications and Services</b>						
14	Business, Agriculture		2			3
15	Government		2			3
16	K-12 Schools		2+			3
17	Higher Education		2+			3
18	Libraries		2+			3+
19	Healthcare	1				2
20	Community		2			2+
21	Real Estate Development					
<b>Networked Economy</b>						
22	Innovation					
23	Workforce		2+			3
24	Consumer		2			2
<b>Networked World Enablers</b>						
25	Ubiquity		2			4-
26	Security	1				2
27	Privacy	1				1+
28	Policy	1				3

Continued on the following page

<sup>57</sup> CSPP Assessment Tool

Quality of Life Indicators						
29	Environment				4	4
30	Recreation		2+			3
31	The Arts			3+		4
32	Urban Design Housing			3		3+
33	Housing			3+		4
34	Public Safety				4	4
35	Health Care			3+		4
New Economy Indicators						
36	Collaboration			3		3+
37	University				4-	4
38	Airport	1				1+
39	K-12 System				4-	4

### Workshop Identified Initiatives by Sector

#### Business

- Create public/private partnerships to educate businesses about use and availability of technology for their business
- Identify cost effective ways to acquire the technology
- Develop gap analysis for network applications and services between businesses and customers
- Foster industry and higher education partnerships related to training and education
- Change existing private/public economic development paradigm
- Bolster infrastructure city-wide for wireless

#### Community Based Organizations

- Create a partnership of CBOs, government and foundation, education, and technology providers to a) educate CBOs about technology and web-based services (and benefits!) and; b) support development and deployment of internal and online services
- Create a web portal for centralized information and referral services
- Create a citywide or regional project to work to insure access and training to all segments of the population regardless of age, economic status, disadvantaged or disabled, geography, or language

#### Education

- Enhance connectedness within the Lincoln community and with out state communities

- Expand interconnection with Omaha computer resources
- Interface closely with K-12 programs
- Identify venture capitalist
- Identify legal restraints
- Focus efforts on network applications and services
- Identify ways to provide comprehensive and continual training for teachers
- Pursue pilot on-line, secure grade access, attendance, curriculum, assignments and guided student account use

## **Government**

- Match public dollars with private dollars for technology initiatives.
- Integrate GIS applications into government applications.
- Investigate the possibility of creating a city/county CIO to coordinate policy and technology initiatives

## **Healthcare**

- Outreach – broadband access (affordable) statewide.
- Knowledge of available fiber citywide, statewide.
- Education of providers of ways to enter electronic world securely, economically.

## **Libraries**

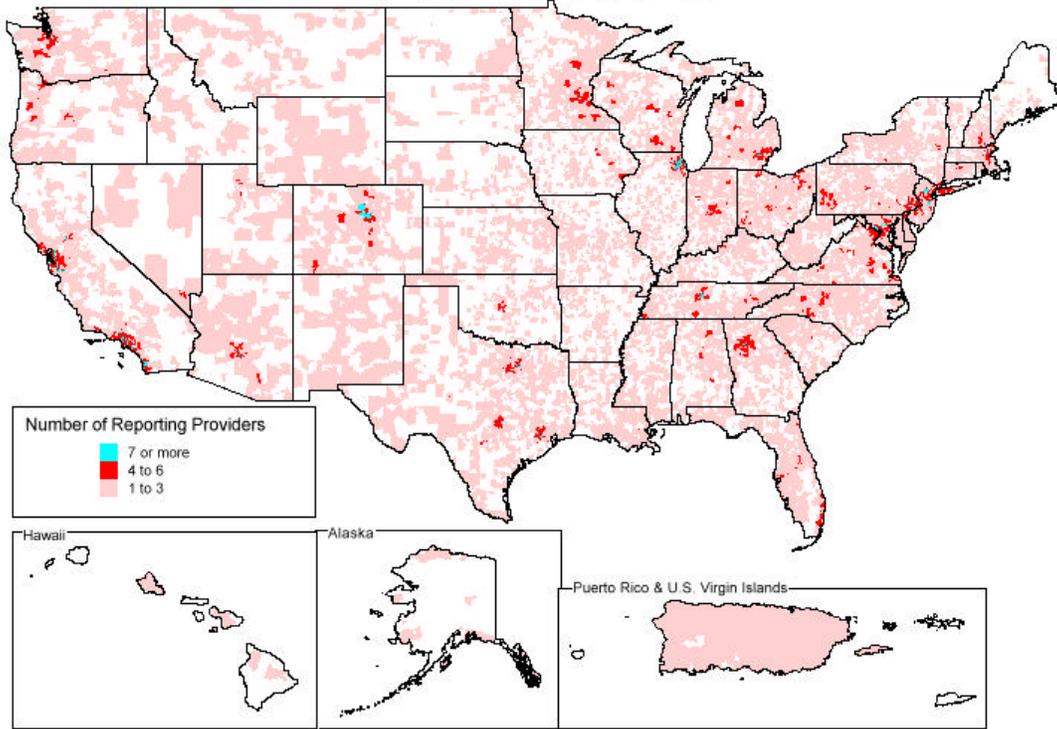
- Create a partnership between multi-type libraries and other information service providers
- Negotiate through partnerships for better access and cost. Don't spend resources for redundancy
- Promote Nebraska's e-Library with Lincoln as a major participant, as part of the Libraries for the 21st Century
- Locate financial resources and partnerships

## **Quality of Life**

- Better market the community's quality of life in economic development materials.
- Inventory the differing initiatives that are underway and planned that will further improve the communities quality of life. Ensure there are broad based initiatives designed to improve Lincoln.
- Develop an annual strategic plan outlining planned initiatives designed to improve the community's quality of life.

# Appendix B

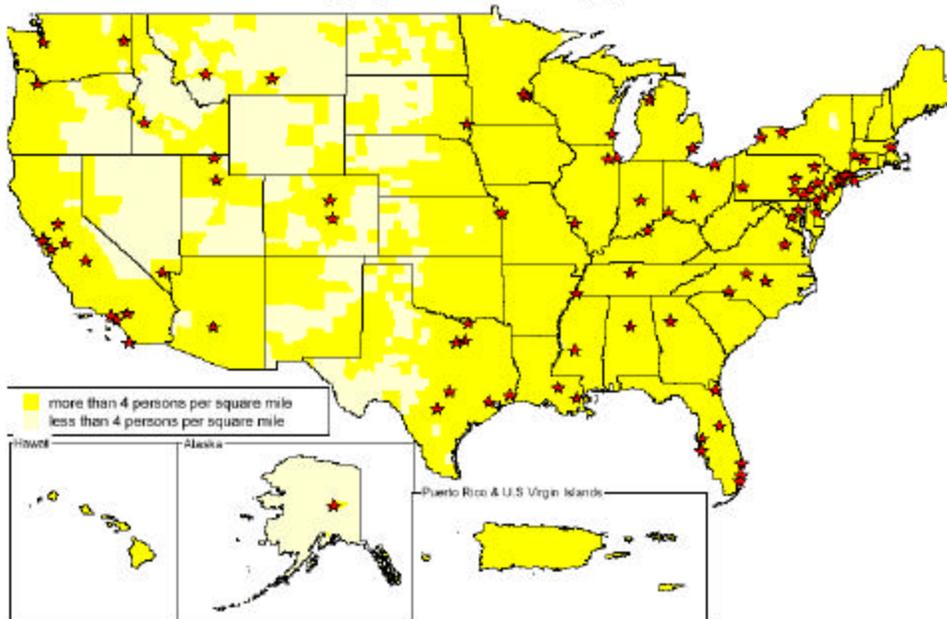
**Figure 7**  
**High-speed Providers by Zip Code**



Source: Broadband Survey (1999)

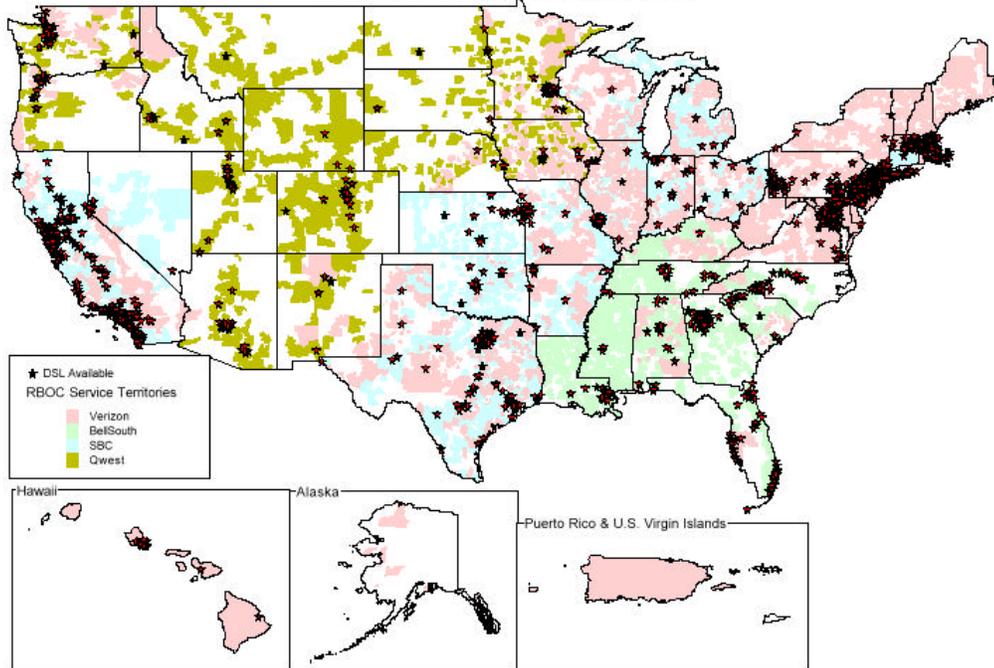
39

**Figure 15**  
**High-speed Fixed Wireless Deployment**



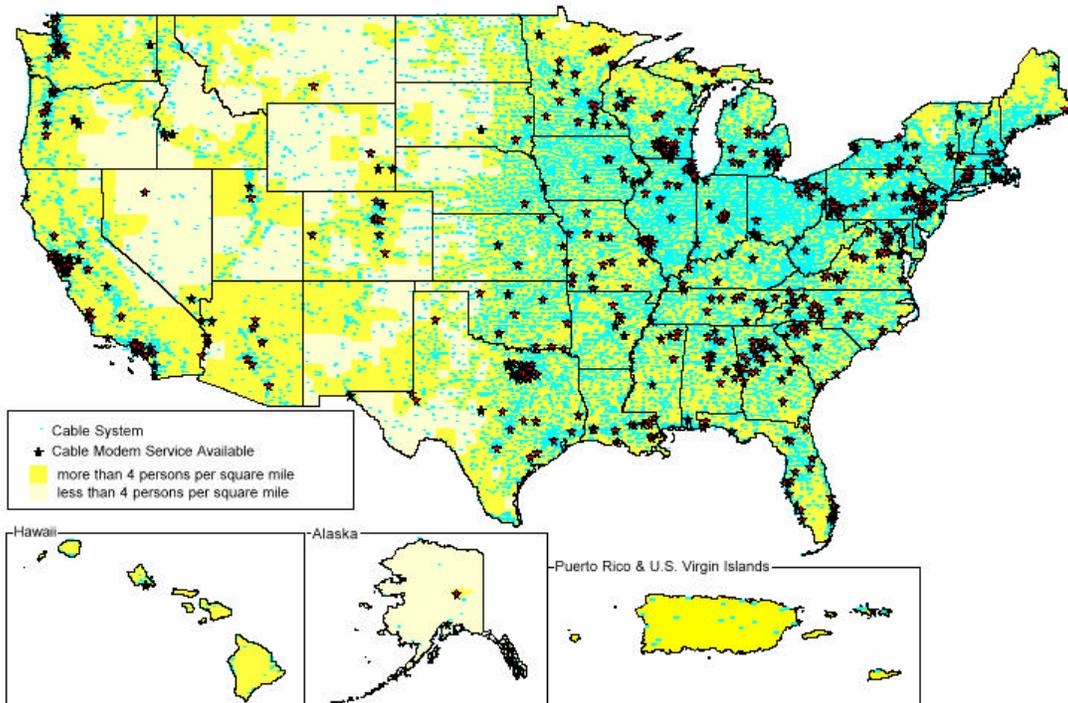
51

**Figure 14**  
**DSL Deployment by RBOCs and DLECs**



Source: "Advanced Telecommunications in Rural America," NTIA, RUS, NECA Tariff 4, websites of Bell Atlantic, US West, Covad, Northpoint, and Rhythms.

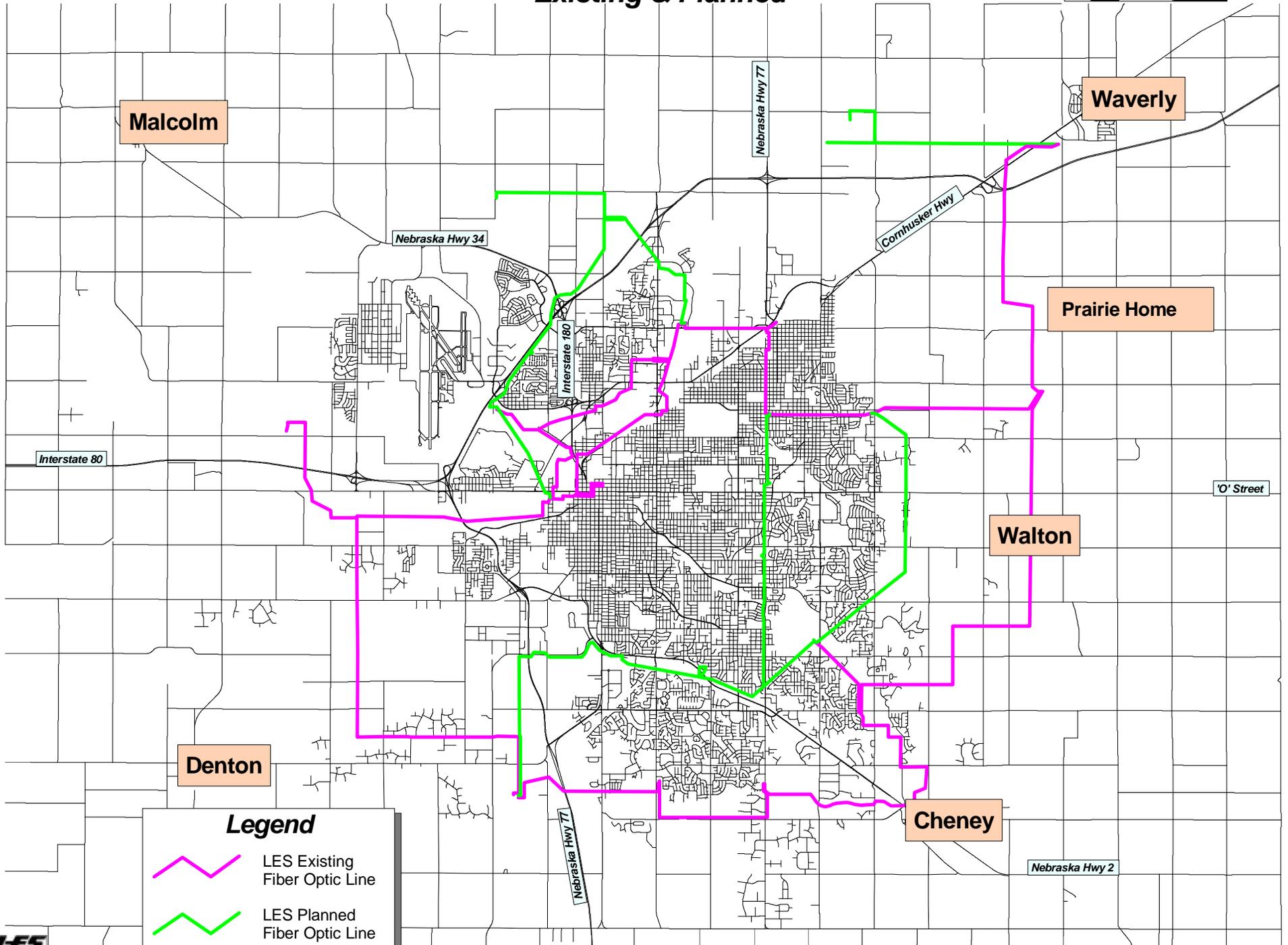
**Figure 12**  
**Cable Modem Deployment in the United States**



Source: FCC cable system registrations and aeronautical frequency notifications; "Advanced Telecommunications in Rural America," NTIA, RUS.

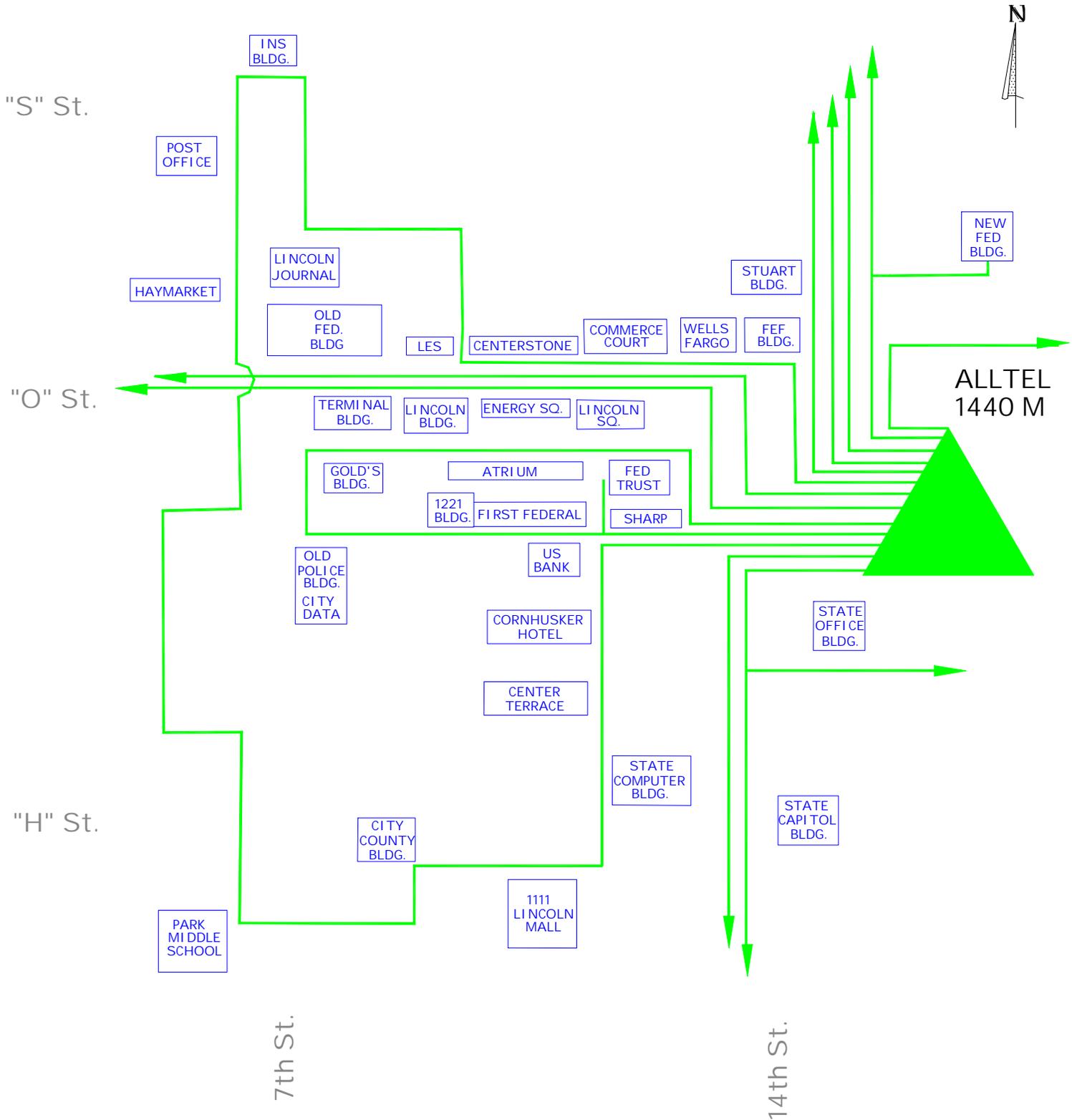
# Lincoln Area LES Fiber Optic Lines Existing & Planned

1 0 1 2 Miles



**Legend**

-  LES Existing Fiber Optic Line
-  LES Planned Fiber Optic Line



# ALLTEL

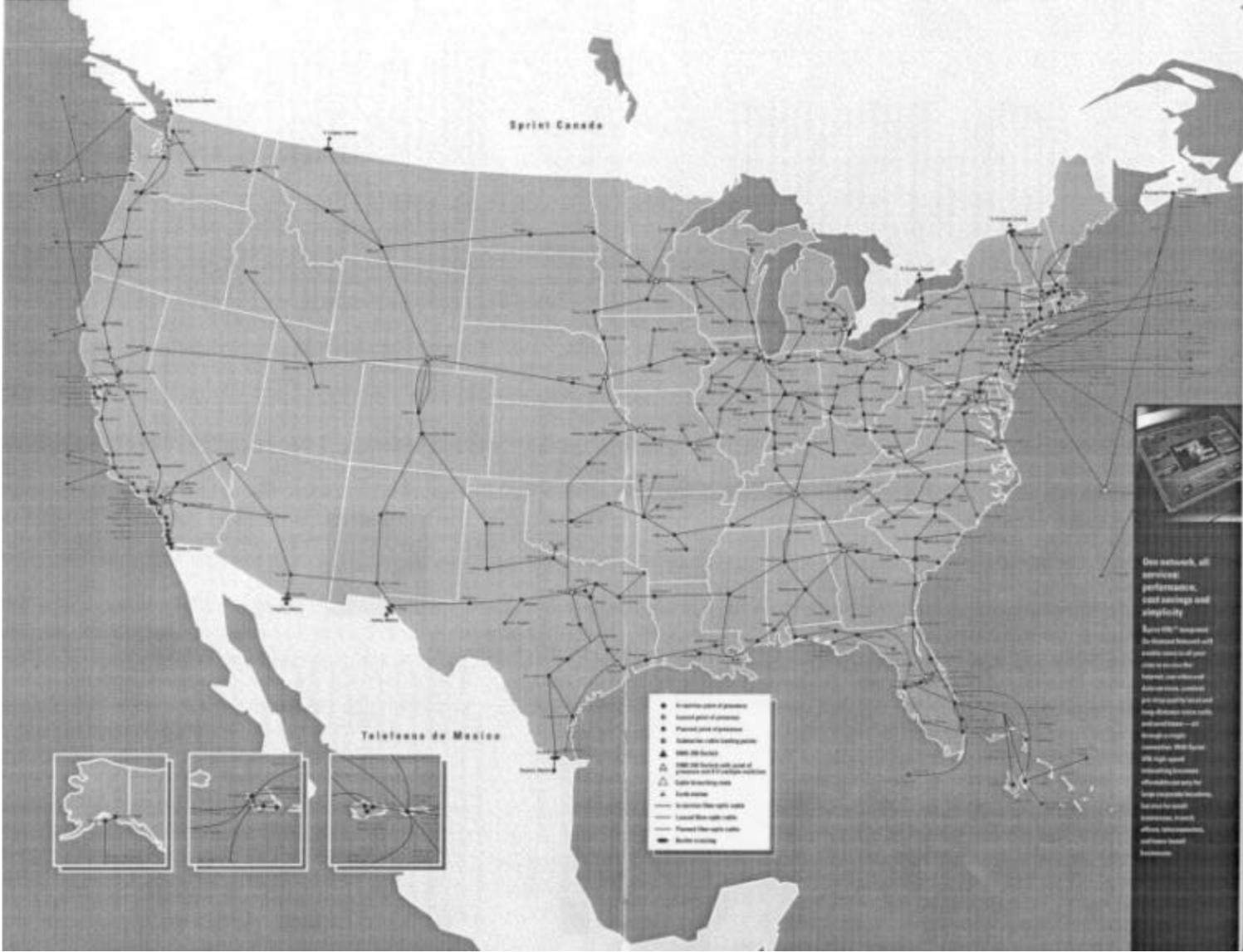
## DOWNTOWN FIBER

 FIBER ROUTES

- Over 500 miles of fiber in downtown Lincoln
- Over 7600 miles of fiber throughout Lincoln (ADSL is available throughout downtown, subject to line testing)



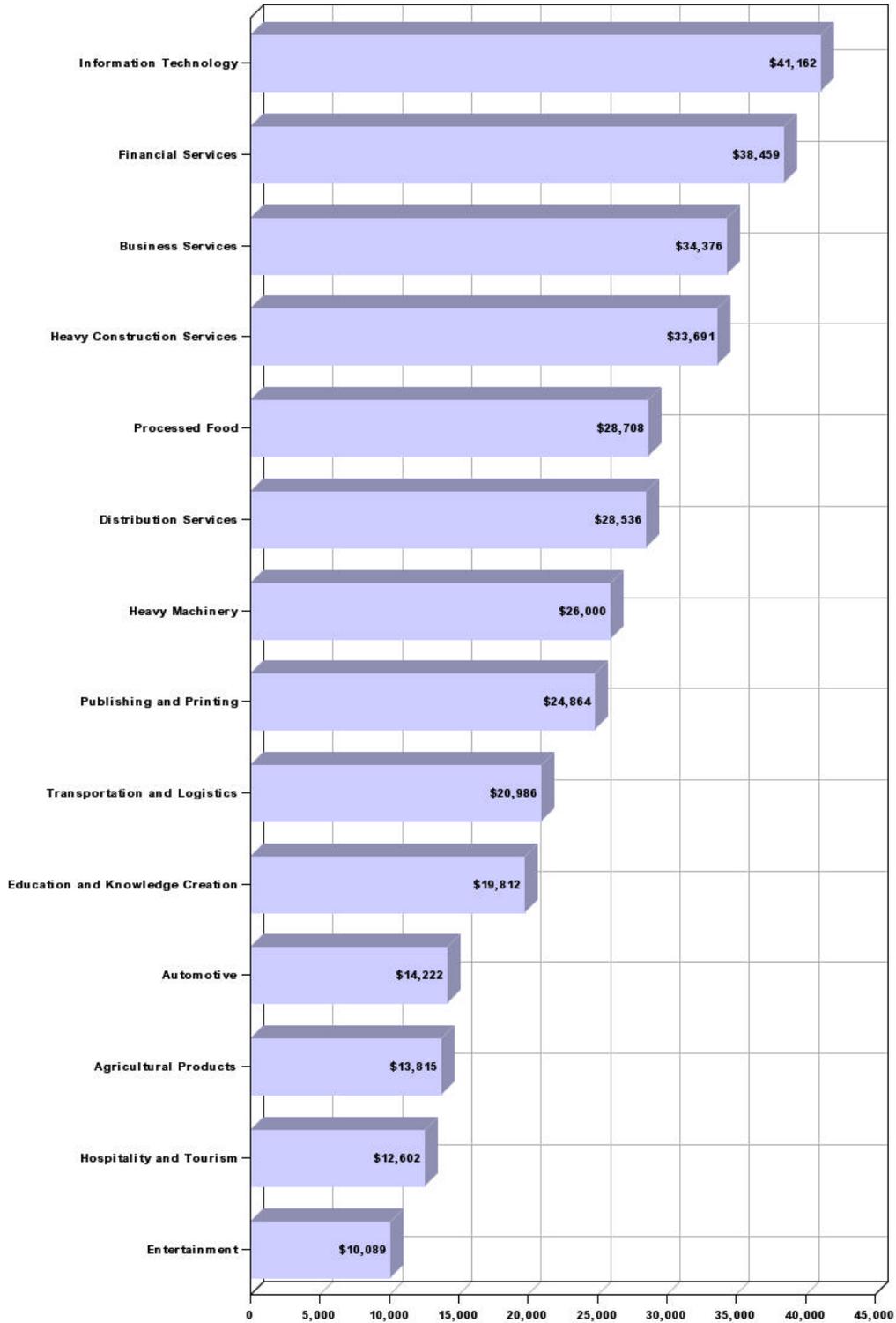
# Infrastructure Map Provided by Sprint



# Appendix D

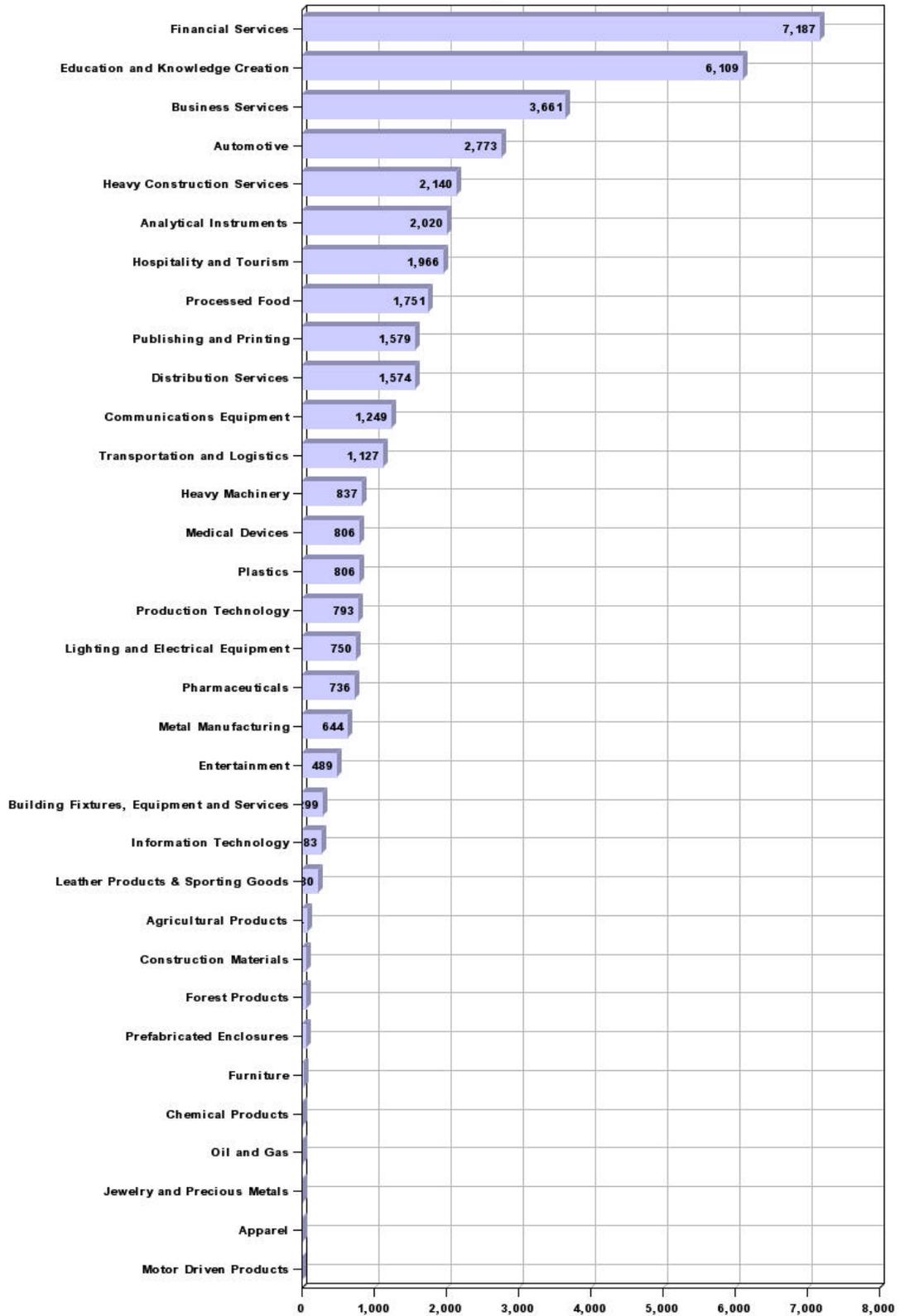
Source: Harvard University

Lincoln, NE Metropolitan Area  
Wages by Traded Cluster, 1999  
Using Narrow Cluster Definition



Source: Harvard University

Lincoln, NE Metropolitan Area  
Employment by Traded Cluster, 1999  
Using Narrow Cluster Definition





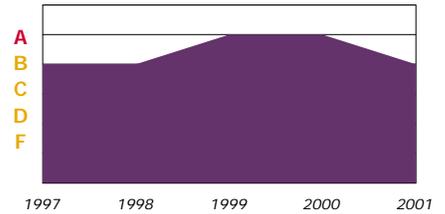
2001 Development Report Card

Comprehensive Measure Ranking and Five-Year Trends: Nebraska

Performance

			50th	40th	30th	20th	10th
Employment	Long-Term Employment Growth	36	[Bar chart]				
	Short-Term Employment Growth	7	[Bar chart]				
	Unemployment Rate	9	[Bar chart]				
	Mass Layoffs	1	[Bar chart]				
Earnings & Job Quality	Average Annual Pay	40	[Bar chart]				
	Average Annual Pay Growth	15	[Bar chart]				
	Employer Health Coverage	24	[Bar chart]				
	Working Poor	21	[Bar chart]				
	Involuntary Part-Time Employment	8	[Bar chart]				
Equity	Poverty Rate	28	[Bar chart]				
	Income Distribution	10	[Bar chart]				
	Income Distribution Change	32	[Bar chart]				
	Rural/Urban Disparity	40	[Bar chart]				
Quality of Life	Net Migration	36	[Bar chart]				
	Infant Mortality	27	[Bar chart]				
	Uninsured Low Income Children	4	[Bar chart]				
	Teen Pregnancy	13	[Bar chart]				
	Heart Disease	21	[Bar chart]				
	Homeownership Rate	26	[Bar chart]				
	Charitable Giving	12	[Bar chart]				
	Voting Rate	24	[Bar chart]				
Resource Efficiency	Crime Rate	26	[Bar chart]				
	Per Capita Energy Consumption	27	[Bar chart]				
	Renewable Energy	13	[Bar chart]				
	Toxic Release Inventory	19	[Bar chart]				
	Recycling Rate	29	[Bar chart]				
	Greenhouse Gas Emissions	35	[Bar chart]				
	Vehicle Miles Traveled	20	[Bar chart]				

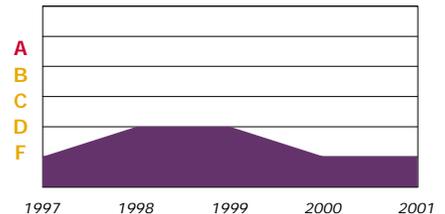
Performance History



Business Vitality

			50th	40th	30th	20th
Competitiveness of Existing Businesses	Traded Sector Strength	24	[Bar chart]			
	Change in Traded Sector Strength	35	[Bar chart]			
	Business Closings	15	[Bar chart]			
	Manufacturing Capital Investment	38	[Bar chart]			
Structural Diversity	Sectoral Diversity	39	[Bar chart]			
	Dynamic Diversity	46	[Bar chart]			
Entrepreneurial Energy	New Companies	44	[Bar chart]			
	Change in New Companies	24	[Bar chart]			
	New Business Job Growth	39	[Bar chart]			
	Technology Companies	19	[Bar chart]			
	Initial Public Offerings	27	[Bar chart]			

Business Vitality History



Development Capacity

			50th	40th	30th	20th	10th
Human Resources	Basic Educational Skills Proficiency-Reading	40	[Bar chart]				
	Basic Educational Skills Proficiency-Math	17	[Bar chart]				
	Average Teacher Salary	35	[Bar chart]				
	K-12 Education Expenditures	16	[Bar chart]				
	High School Graduation	2	[Bar chart]				
	High School Attainment	9	[Bar chart]				
Financial Resources	College Attainment	38	[Bar chart]				
	Venture Capital Investments	43	[Bar chart]				
	SBIC Financing	45	[Bar chart]				
	Loans to Small Business	4	[Bar chart]				
Infrastructure Resources	Personal Income from Div, Interest & Rent	19	[Bar chart]				
	Highway Deficiency	34	[Bar chart]				
	Bridge Deficiency	32	[Bar chart]				
	Urban Mass Transit	33	[Bar chart]				
	Sewage Treatment Needs	26	[Bar chart]				
Amenity Resources & Natural Capital	Digital Infrastructure	22	[Bar chart]				
	Energy Cost	9	[Bar chart]				
	Urban Housing Costs	13	[Bar chart]				
	Health Professional Shortage Areas	16	[Bar chart]				
	Conversion of Cropland to other Uses	9	[Bar chart]				
Innovation Assets	Air Quality	24	[Bar chart]				
	Ph.D. Scientists & Engineers	36	[Bar chart]				
	Science/Engineering Grad.Students	35	[Bar chart]				
	Computers in Households	34	[Bar chart]				
	University Research & Development	11	[Bar chart]				
	Federal Research & Development	44	[Bar chart]				
	Private Research & Development	43	[Bar chart]				
	SBIR Grants	46	[Bar chart]				
	Royalties and Licenses	31	[Bar chart]				
	Patents Issued	34	[Bar chart]				
	University Spin-outs	21	[Bar chart]				

Development Capacity History

