

NEBRASKA BUSINESS USE OF INFORMATION TECHNOLOGY



**A Report Compiled by
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The Applied Information Management Institute

in cooperation with



**Center for Applied Rural Innovation (CARI)
University of Nebraska-Lincoln**

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Executive Summary

In recent years, the convergence of computer and telephone technologies has created the Internet, perhaps history's most explosive and rapidly embraced technology. According to a special report by the Center for New West, "The spread of Internet usage - what the experts call 'innovative diffusion' - has been explosive. Measured by the time required to reach 50 million users, the public Internet, which took four years to reach 50 million, is spreading more rapidly than radio (38 years), the personal computer (18 years), television (13 years) or any other modern technology. Result: measured by consumers online, the Internet has already achieved 'mass market' status.¹"

Nationally: "Rural households, which historically trailed those in central cities and urban areas, are showing significant gains in Internet access. The gap between households in rural areas and households nationwide that access the Internet has recently narrowed. There was a 4.0 percentage point difference in 1998, narrowing to a 2.6 point difference in 2000.²"

These developments have not escaped the attention of Nebraska business owners and operators. Information technologies are widely used by Nebraska business. In this survey of 382 rural Nebraska business owners and managers, computers and other information technologies are being used extensively for a variety of business operations.

¹ The "Other" Digital Divide; Burgess, Philip M. and Raitano, Florine P.; Center for the New West; special report September 1999 online edition; Denver, CO; www.newwest.org.

² Falling Through the Net; Toward Digital Inclusion; U.S. Dept. of Commerce, Economics & Statistics Administration, National Telecommunications and Information Division; October, 2000.

Rural Nebraskans' Use of the Web

Nebraska business using computer technologies	78.6%
Nebraska business connected to the Internet	58.4%
Nebraska business owners/managers with computers in their home	70.5%
Nebraska business owners/managers connected to the Internet in their home	61.1%
Nebraska business using e-mail	57.9%
Nebraska households connected to the Internet	37.0%
Nebraska rural households that purchased goods and services using the Internet this last year	29.0%

While use of both computer and Internet technology are growing rapidly, the study reveals that computer technologies are currently more heavily used than Internet technologies today. This reflects, in part, the historical 20-year availability of PC-based technologies and many "off the shelf" computer-based business software solutions available today.

Conversely, for the Internet, the intellectual and technical infrastructure is clearly not as "mature" as computer based business solutions. While some Internet based business functions are readily accessible and easy to use, others are not.

- Some applications, like e-mail, are readily available and easily implemented.
- Information and research is readily available; however, a higher degree of study and practice is required to become highly proficient.
- Vendor-based solutions for many applications and business functions are immature, including:
 - catalog posting
 - payment systems
 - security solutions
 - banking solutions
 - etc.
- Web development varies from relatively primitive solutions to highly sophisticated sites.

Generally, it will be some time before mature Internet based industry and enterprise business solutions are available "off the shelf." When looking to the future, however, Nebraska business owners and managers projected rapid growth in every computer and Internet based business activity. Information technologies are clearly viewed as key to future business development and growth.

When looking at the following data, one must conclude that Nebraska citizens and businesses are about to hit "critical mass" on the use of Internet technologies. Once that "critical mass" is hit, there is likely to be profound implications to Nebraska business and commerce as electronic alternatives become the norm for numerous business operations and social activities.

From an economic development perspective, it is absolutely critical that Nebraska business and entrepreneurs have the technical access and knowledge to use information technology to remain competitive and expand market opportunities. It is

the current and future businesses that will provide the employment opportunities and become the engine for economic growth. These businesses, from agricultural to zoological endeavors, must remain competitive. The emerging, networked/E-world creates enormous opportunities for Nebraska business to grow. These same conditions create an opposite risk if they lose market shares to new cyber competitors.

Growth in the intellectual infrastructure must be robust and World Class at both the community level and state level. All segments of the society- private sector, government and education - must have a perspective that fosters opportunities for Nebraska employers to gain the required knowledge and strategic thinking.

The technical infrastructure must also grow in capacity as rapidly as market requirements expand and competitive regions develop. Unfortunately, capacity and availability of the core communications technologies are largely outside the control of individual Nebraska businesses. Growth in this infrastructure rests with various providers, and will be influenced by the unique requirements to provide services to low-density population areas, numerous regulatory policies and various public policy considerations.

Introduction

In recent years, the convergence of computer and telephone technologies has created the Internet, perhaps history's most explosive and rapidly embraced technology. According to a special report by the Center for New West, "The spread of Internet usage - what the experts call 'innovative diffusion' - has been explosive. Measured by the time required to reach 50 million users, the public Internet, which took four years to reach 50 million, is spreading more rapidly than radio (38 years), the personal computer (18 years), television (13 years) or any other modern technology. Result: measured by consumers online, the Internet has already achieved 'mass market' status."³

This same report noted that, "The Internet is a central feature of America's New Economy. Consumers are buying more and more over the Internet with each passing month. Forrester Research says that business-to-consumer e-commerce totaled \$8.0 billion last year and will increase to \$108 billion in 2003.

By contrast, business-to-business e-commerce is five times larger and growing much faster than business-to-consumer e-commerce - totaling \$43 billion last year and will explode to more than \$1.3 trillion in 2003."⁴

According to a recent U.S. Department of Commerce study, the number of households with Internet access is increasing rapidly. Nationally: "The share of households with Internet access has soared, rising from 26.2% in December 1998 to 41.5% in August 2000."⁵

³ The "Other" Digital Divide; Burgess, Philip M. and Raitano, Florine P.; Center for the New West; special report September 1999 online edition; Denver, CO; www.newwest.org.

⁴ Ibid

⁵ Falling Through The Net; Toward Digital Inclusion; U.S. Dept. of Commerce, Economics & Statistics Administration, National Telecommunications and Information Division; October, 2000

This same U.S. Department of Commerce study noted that in Nebraska, 37% of Nebraska households have connected to the Internet at home. While slightly below the national average, Nebraskans are well "within the pack" compared to citizens of other states as they install this new technology.

"More than half of all (U.S.) households (51.0%) have computers, up from 42.1% in December 1998. There were 116.5 million Americans online at some location in August 2000, 31.9 million more than there were only 20 months earlier.

The share of individuals using the Internet rose from 32.7% in December 1998 to 44.4% in August 2000. If growth continues at that rate, more than half of all Americans will be using the Internet by the middle of 2001.⁶"

Nationally: "Rural households, which historically trailed those in central cities and urban areas, are showing significant gains in Internet access. The gap between households in rural areas and households nationwide that access the Internet has recently narrowed. There was a 4.0 percentage point difference in 1998, narrowing to a 2.6 point difference in 2000.

In rural areas this year, October 2000, 38.9% of households had Internet access an increase from 1998's access rate of 22.2%. In October 1997, just 14.8% of rural households had online access⁷"

From a Nebraska retail consumer perspective, a Year 2000 Study by the Center for Applied Rural Innovation noted 29% of rural Nebraska households had purchased goods or services using the Internet during the past year. The goods and services purchased online include music and books (48%), computer hardware or software

⁶ Ibid

⁷ Falling Through the Net; Toward Digital Inclusion; U.S. Department of Commerce, Economics & Statistics Administration, National Telecommunications and Information Division; October, 2000.

(38%), and clothing (34%). The study further noted the value of items purchased were small (35% less than \$100 and only 17% over \$500). "Over one-third (37%) of rural Nebraskans believe their households will make online purchases next year."⁸

These developments have not escaped the attention of Nebraska business owners and operators. Information technologies are widely used by Nebraska business. In a recent survey of 382 rural Nebraska business owners and managers, computers and other information technologies were reported to be used extensively for a variety of business operations.

<i>Business Application</i>	<i>Used Extensively Today</i>	<i>Very Important Future</i>
<i>Computers for:</i>		
General Correspondence/Communication	25.2%	46.8%
Record Keeping/Accounting/Payroll	54.6%	67.3%
Internet Access	17.9%	39.6%
<i>Internet for:</i>		
E-mail	18.8%	38.5%
Information & Research	12.7%	36.3%
Promote Business	4.1%	23.1%

The operators expressed that these same technologies would be very important to the future of their businesses.

The University of Nebraska Center for Applied Rural Innovation and the Applied Information Management (AIM) Institute partnered in a study to understand the business practices and requirements of Nebraska business leaders and entrepreneurs. The study was designed to document Nebraska business owners' and managers' opinions, needs and attitudes about information technology.

⁸ Allen, John C.; Vogt, Rebecca; Cordes, Sam. "Retailing in Rural Nebraska: Buying Locally and Electronically" Center for Applied Rural Innovation. University of Nebraska Institute of Agriculture and Natural Resources. Lincoln, NE.

The object of the study was to document how information technologies are used in Nebraska business located outside major metropolitan areas. Therefore, questionnaires were sent to businesses located in all Nebraska counties, except Greater Omaha, (Douglas, Sarpy and Washington counties) and Lincoln, (Lancaster county). This more rural focus will help business owners, managers and policy makers interpret business and community needs in areas with different technology and business environments than those present in the Omaha and Lincoln metropolitan areas. The survey questionnaire, shown in Appendix I, was mailed statewide to 850 businesses. The 382 responses (45% response rate) were gathered during the period from August 9 through September 29, 2000. Results were tabulated showing the composite findings of all 382 respondents, as well as summaries by business size, community size, business type and level of information technology expertise now used in the business.

Findings - All Respondents

Demographics

The average size of the 382 firms responding to the survey was 13 employees with a range from 1 to 500 employees. Nearly 80% of all firms had 10 or less employees. In terms of gross annual sales, 29% had sales under \$100,000, 36% had sales between \$100,000 and \$499,999, and 35% had sales of \$500,000 or above.

As noted above, 37% of Nebraska households are connected to the Internet at home. In this study, 61.1% of the survey respondents had Internet at home and 70.5% had a computer at home.

Most (72%) businesses were located in retail office space or a manufacturing site. Farm and home-based businesses accounted for only 3.7% and 10.1% of all business locations, respectively. Nearly one-third (31.5%) of the businesses were located in areas in which the nearest community had a population of less than 5,000. Communities with 20,000 or more housed 44.8% of the businesses responding to the survey.

Wholesale and retail trade was the largest business class (24.6% of the responses) followed by professional and related services (18.4%). Over 96% of the questionnaires were completed by owners, operators or managers of the businesses. Their average age was 49. Thirty-six percent were women.

This high level of executive participation in the study documents how Nebraska business executives view the relevance of information technology to present and future business practices. The results show these business leaders are increasingly building information technology-based processes and techniques into their future plans.

Technology Now Used

Nebraska businesses are heavy users of information technologies. Nearly 8 in 10 businesses now use computer technologies, while 58.4% are connected to the Internet and 31.0% have a web site. Computer usage even exceeds the use of the fax, (73.8%); and cell phones (74.5%). Only 18.7% of the businesses said they were non-users of either computer or Internet technologies.

As mentioned above, computer usage is highest for general correspondence and communications; record keeping; accounting and payroll; and Internet access. Internet usage was highest for e-mail, information and research, and to promote business.

The survey results show relatively low current application of Internet technology to other business activity and operations. Table 1 illustrates, however, that these Internet applications are expected to be much more significant in the future. These future uses will likely depend, in part, upon the availability of support services in the community, industry trends, and the availability of technical skills required for implementation.

TABLE 1

***Current and Future Computer and Internet Use
Nebraska Rural Businesses
All Respondents***

<i>Business Function</i>	<i>Present Usage</i>		<i>Future Usage</i>	
	<i>Used Extensively In My Business</i>		<i>Somewhat Important To My Business</i>	<i>Very Important To My Business</i>
<i>Computer</i>				
Data base management	29.3%		25.6%	44.2%
Process and management	8.7%		21.1%	13.0%
Develop presentations, marketing and sales materials	7.0%		31.4%	22.3%
Online banking and other financial services	3.0%		27.6%	11.4%
<i>Internet</i>				
Link to vendors and suppliers	3.0%		34.2%	16.9%
Post catalogs/prices/services on web	2.5%		25.5%	13.6%
Complete sales and/or purchases with online payment	0.6%		28.4%	8.6%
Use Internet for inventory control and management	1.7%		25.1%	7.1%
Use Internet for customer information and support	3.6%		38.0%	19.3%
Use Internet to take/provide educational services	1.9%		39.7%	14.9%

Skill Requirements

Forty-one percent of all respondents expected to expand or restructure their business using information technologies in the future. When asked, "What are the greatest challenges to expand or restructure their business?", their responses were focused on business applications, not the technology of the web.

70.7% Need understanding of opportunities available in using the Internet.

62.8% Need understanding of how industry is using the Internet.

Respondents must understand market forces, trends and the use of the web for their business. Certainly, the technology and infrastructure are important, but "winning" business applications must be first understood and developed.

When asked about the source of the "specialized skills" required to develop successful Internet business strategies, few of the respondents personally had the skills and most did not have someone in their business who possessed these skills. Table 2 reveals that nearly one-half of the firms must rely on the availability of such skills in their community. Approximately one-third believed such skills were "not available" locally.

TABLE 2

**Intellectual Infrastructure
Skill Requirements for Successful Internet Business Strategies
All Respondents**

Question: Successful Internet business strategies require specialized skills. Do you have access to someone with the following specialized skills?

Specialized Skills	<u>Not Available</u>	<u>I have Skill</u>	<u>Someone in Business</u>	<u>Someone in Community</u>
Conceptualizing Web site attributes	32.6%	2.7%	18.3%	46.3%
Developing a basic Web site	27.2%	3.0%	18.7%	51.1%
Programming Web-based applications	33.1%	1.2%	15.5%	50.2%
Developing graphics for the Internet	33.8%	1.8%	16.9%	47.4%
Graphic animation	39.5%	1.3%	11.8%	47.5%
Developing security services for online transactions	44.2%	0.6%	11.0%	44.2%
Making electronic payments	35.1%	8.5%	15.0%	41.4%

Table 2 represents, in part, the "intellectual infrastructure" or knowledge skills required by the firm to effectively develop successful strategies and applications. These skills must be available to the firm either from internal or external sources. Communities or regions that do not have a sufficient breadth, quantity and quality of such skills will handicap their local businesses and entrepreneurial enterprises as they compete in regional and global markets.

Community Infrastructure

Not only must the firm and/or community have the "intellectual infrastructure" or knowledge base, the technology infrastructure must be available as well. Table 3 shows that, while many businesses currently use Internet technologies, they "don't know" if their community has adequate resources. While these data summarize the responses of all 382 respondents, later findings report that the most proficient users of information technology are more acutely aware of their community's infrastructure.

The barrier of bandwidth and other limitations are not a barrier until it affects your operations. To illustrate, when asked in a separate question, "Is bandwidth a barrier for your business plans today?":

10.1% said yes

22.8% said no

67.1% said don't know.

TABLE 3

**Technology Infrastructure
Resources Available for Successful Internet Business Strategies
All Respondents**

Question: How adequate are the resources available to your business in the following areas?

Technology	<u>Don't Know</u>	<u>Not at all Adequate</u>	<u>Somewhat Adequate</u>	<u>Very Adequate</u>
Technology infrastructure	55.6%	7.4%	24.7%	12.4%
Bandwidth/Internet access speed	51.9%	12.1%	26.0%	10.0%
Web development professionals	41.7%	11.5%	31.4%	15.4%
Internet access providers	30.1%	7.4%	31.9%	30.7%
Electronic banking availability	41.9%	6.3%	29.0%	22.8%
Educational opportunities about information technology	39.2%	12.1%	33.6%	15.0%
Hardware/software suppliers	31.0%	11.2%	34.8%	23.0%
Infrastructure support personnel	48.5%	9.6%	28.3%	13.6%

The community that effectively supports their business and entrepreneurial leaders will be the community that has both the technical and intellectual infrastructures that grow and expand as business and consumer requirements grow and expand.

To use an analogy, the auto industry profoundly restructured American society over the last 100 years. But consider the community or region with inadequate or no roads, no auto dealerships, no auto repair shops, no auto parts stores, no insurance agents, no filling stations, no used car lots, etc. Such a community or region will not have fully participated in the dramatic impact of this technology. The same is true with the emerging Internet/Web world. All the service and technical components must be in a community. And, these service and technical components will most certainly change over time. Communities and regions that make it easy for such service and technical providers to become established and grow are the communities that most likely will grow themselves.

Over half (55.6%) of all respondents were "interested in learning how to use a computer and other information technology in their business practices." Over two-thirds were aware of a nearby training and education facility. While the average respondent was willing to travel nearly 64 miles for a 1-day training course, 50% were only willing to spend \$50.00 or less for such a course. Traditional classrooms are still the preferred way to learn (70.1% very comfortable with that option). Table 4 shows that a minority of respondents were also "very comfortable" with other ways to deliver educational services.

TABLE 4**Preference for Educational Delivery Technologies**

Question: How comfortable would you be using the following delivery options for training on how to use a computer and other information technology for your business?

Delivery Technology	Very Comfortable
Interactive TV classrooms, using satellite delivery	29.4%
Internet	24.6%
Video tapes	46.7%
CD Rom	36.5%
Traditional classroom	70.1%

Findings - by Industry

All Nebraska business owners/managers use information technologies, however, there are some variations between industry groups, both in current use and expected future applications. Table 5 shows the percentage of Nebraska respondents, by industry, that currently, extensively use six popular computer and Internet-based applications. Table 6 shows the percentage of these same industry respondents that expect these same applications will be very important to their businesses in the future.

The highest use application for the industry groups, now and in the future, is computer-based record keeping/accounting/payroll. PC-based solutions for such business applications first appeared 20 years ago and commercial software is the most mature of all the above technologies/business solutions listed in Table 5.

Internet-based business solutions are generally about 5 years old and are rapidly being embraced by all industry groups. Compared to PC-based business software, Internet-based business solutions, except e-mail, are still generally in the early development stage. "Off the shelf" Internet solutions are still largely unavailable to most small businesses. However, approximately 20-50% of all businesses deem these technologies to be very important to their future business strategies.

TABLE 5

**Currently Extensively Used
Computer/Internet Applications
By Industry**

Question: How extensively does your business currently use a computer or other information technology for the following business practices?

Business Practice	Agriculture Forestry & Fisheries	Construction Manufacturing Transportation	Retail and Wholesale Trade	Services*	Other
Computers for:	← Currently Extensively Used →				
General correspondence/communications	16%	30%	14%	34%	15%
Record keeping/accounting/payroll	75%	70%	48%	52%	49%
Internet access	26%	26%	11%	19%	15%
Internet for:					
E-mail	20%	32%	13%	20%	13%
Information and research	20%	20%	8%	14%	6%
Promote business	- 0 -	6%	3%	8%	- 0 -

* Includes finance, insurance, real estate; business & repair services; personal services; entertainment and recreational services; professional and related services.

TABLE 6

**Future Very Important
Computer/Internet Applications
By Industry**

Question: How important will using a computer or other information technology for the following business practices be to the future of your business?

Business Practice	Agriculture Forestry & Fisheries	Construction Manufacturing Transportation	Retail and Wholesale Trade	Services*	Other
Computers for:	←————— Future Very Important —————→				
General correspondence/communications	58%	50%	36%	52%	44%
Record keeping/accounting/payroll	84%	77%	67%	63%	64%
Internet access	47%	45%	35%	40%	46%
Internet for:					
E-mail	58%	43%	37%	40%	31%
Information and research	47%	36%	33%	42%	26%
Promote business	42%	15%	28%	24%	18%

* Includes finance, insurance, real estate; business & repair services; personal services; entertainment and recreational services; professional and related services.

Businesses engaged in retail and wholesale trade, appear to be embracing these key technology-based solutions slightly slower than the other industry groupings.

Successful Internet-based business strategies require specialized skills. When asked, "Do you have access to someone with the following skills?" Table 7 shows that respondents in agriculture indicated less availability of such skills than other industry groupings.

TABLE 7

**Access to Specialized Skills
Agricultural Industry Respondents vs. All Respondents**

Question: Successful Internet business strategies require specialized skills. Do you have access to someone with the following skills?

Specialized Skills	Not Available	
	Ag Respondents	All Respondents
Conceptualizing Web site attributes	37%	32.6%
Developing a basic Web site	32%	27.2%
Programming Web-based applications	42%	33.1%
Developing graphics for the Internet	50%	33.8%
Graphic animation	56%	39.5%
Developing security services for online transactions	74%	44.2%
Making electronic payments	58%	35.1%

This variation in availability of skills suggest that businesses in the most rural locations have a lower availability of specialized skills. The data also suggests the technical infrastructure available to the agricultural/forestry/fisheries business is less robust than that available to business in larger communities. One measure was the question, "Is bandwidth a barrier for your business plans today?" 10.1% of all respondents answered "yes". For agriculture, 30% answered "yes" to the same question.

Findings - by Size of Community

Respondents were asked to note the size of community (or nearest community) in which the business is located. Community size seems to be an important indicator of outside resource availability to business owners/managers. The differences appear to be greatest for communities of less than 5,000 compared to those of 5,000-19,999 and those with 20,000 or greater population.

Table 8 shows that required intellectual skills for robust web-based businesses was not available in the local community for approximately one-half of all respondents from the smallest communities. Those businesses in larger communities were much more likely to have required skills available.

The technical infrastructure is also less robust for business located in the smallest communities. Table 9 quantifies that business in communities with populations less than 5,000 are disadvantaged in a variety of different components of the technological infrastructure.

TABLE 8

**Intellectual Infrastructure
Access to Specialized Skills
By Community Size**

Question: Successful Internet business strategies require specialized skills. Do you have access to someone with the following specialized skills?

Specialized Skills	Size of Community		
	Less than 5,000	5,000-19,999	20,000 or more
	←	Skills Not Available	→
Conceptualizing Web site attributes	46%	27%	27%
Developing a basic Web site	40%	18%	24%
Programming Web-based applications	49%	21%	29%
Developing graphics for the Internet	51%	28%	26%
Graphic animation	52%	37%	33%
Developing security services for online transactions	59%	44%	34%
Making electronic payments	45%	36%	29%

TABLE 9

**Technology Infrastructure
Adequate Technology Resources
By Community Size**

Question: How adequate are the resources available to your business in the following areas?

Technology	Size of Community					
	Less than 5,000		5,000 - 19,000		20,000 or more	
	<i>Somewhat</i>	<i>Very</i>	<i>Somewhat</i>	<i>Very</i>	<i>Somewhat</i>	<i>Very</i>
Technology infrastructure	22%	9%	27%	13%	26%	14%
Bandwidth/Internet access speed	19%	7%	31%	12%	28%	12%
Web development professionals	29%	9%	32%	17%	33%	19%
Internet access providers	29%	20%	38%	34%	31%	37%
Electronic banking availability	23%	15%	31%	23%	32%	28%
Educational opportunities about IT	28%	7%	40%	14%	35%	21%
Hardware/software suppliers	35%	15%	40%	20%	34%	30%
Infrastructure support personnel	28%	7%	36%	9%	25%	20%

These data show that the most significant difference exists when comparing the smallest communities (less than 5,000) with larger communities. There appears to be very little difference between communities of 5,000 - 19,999 and those over 20,000 in population when comparing either the intellectual or technical IT infrastructure of the communities.

Findings - by Size of Business

One of the most significant indicators of the use of information technology by rural Nebraska businesses was the size of business measured by annual gross sales in 1999. Of the 382 respondents, 336 reported their gross receipts. These were about equally distributed.

Firm Size	
<i>Gross Sales - 1999</i>	<i># of Respondents</i>
Less than \$100,000	97
\$100,000 to 499,999	120
\$500,000 or more	119

When asked, "Are the following technologies used in your business?" The larger the business, the more likely these core technologies were used. Computer usage reached 98% of all business with \$500,000 or more in gross receipts in 1999 (Table 10). These largest businesses were also twice as likely to be connected to the Internet as compared to business with less than \$100,000 in gross receipts. They were nearly four times as likely to have a web site. Over one-half of these larger businesses were considering using information technologies to expand or restructure their businesses.

TABLE 10**Technologies Used In Business
By Firm Size**

Question: Are the following technologies used in your business?

Technology Used	<i>Less than \$100,000</i>	<i>\$100,000- \$500,000</i>	<i>\$500,000 or More</i>	<i>All Firms</i>
Computer	52%	82%	98%	79%
Internet access	37%	63%	76%	54%
Web site for business	11%	29%	47%	31%

Question: Are you considering using IT to expand or restructure your business?

Percentage of "Yes" answers	35%	38%	56%	41%
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For every technology based business practice, future use was projected to exceed current usage for every size of business. The top panel of Table 11 shows that 15% of the smallest businesses now extensively use computers for general correspondence today. The bottom panel shows that 28% expect computers for general correspondence will be very important for future business. Every computer based and Internet-based business practice shows a similar dramatic increase as rural business owners and managers look to the future.

Table 12 shows the identical pattern for mid-sized and largest firms. In no case is future usage of any information technology expected to be less important in the future than it is today. Throughout this study, this finding applies to every case. Future IT use is more important when looking at the data by size of company, type of business, size of community, level of expertise in the business, and all businesses combined.

TABLE 11

**Use of IT Applications
By Firm Size**

Question: How extensively does your business currently use a computer and other information technology for the following business practices?

Business Practice	Gross Sales in 1999		
	<i>Less than \$100,000</i>	<i>\$100,000 - \$500,000</i>	<i>Over \$500,000</i>
Computer for:	← Extensively Used Today →		
General correspondence/communications	15%	17%	39%
Record keeping/accounting/payroll	25%	55%	78%
Internet access	10%	14%	26%
Internet for:			
E-mail	10%	15%	29%
Information and research	7%	14%	17%
Promote business	1%	3%	8%

Question: How important will using a computer and other information technology for the following business practices be to the future of your business?

	← Very Important Future Business Practice →		
Computer for:			
General correspondence/communications	28%	39%	68%
Record keeping/accounting/payroll	37%	69%	87%
Internet access	22%	34%	56%
Internet for:			
E-mail	22%	34%	56%
Information and research	24%	36%	48%
Promote business	12%	22%	35%

Respondents were asked to report on use of other computer and Internet technologies that are less widely used today but are likely to grow in importance in the future. Table 12 documents substantial growth in these emerging business applications particularly for the largest firms. In every case, each of these lesser used computer and Internet applications, is considered to be more important in the future than it is today. This was true for firms of all sizes. In addition, in nearly every case, when large firms were compared to small firms, they view each technology more important both today and in the future.

TABLE 12

**Lesser Used IT Applications
By Firm Size**

Business Practice	Gross Sales in 1999		
	<i>Less than \$100,000</i>	<i>\$100,000 - \$500,000</i>	<i>Over \$500,000</i>
	← Extensively Used Today →		
Computer:			
Data base management	7%	26%	51%
Process and manufacturing	5%	5%	16%
Develop presentation/marketing and sales materials	7%	3%	12%
Online banking and other financial services	0%	3%	7%
Internet:			
Link to vendors and suppliers	0%	3%	7%
Post catalogs/prices/services on Web	0%	2%	5%
Complete sales and/or purchases with online payment	0%	0%	2%
Use Internet for inventory control and management	0%	1%	3%
Use Internet for customer information and support	0%	3%	8%
Use Internet to take/provide educational services	1%	2%	3%
	Very Important Future Business Practice		
Computer:			
Data base management	14%	44%	67%
Process and manufacturing	6%	8%	26%
Develop presentation/marketing and sales materials	17%	17%	31%
Online banking and other financial services	4%	11%	21%
Internet:			
Link to vendors and suppliers	7%	14%	28%
Post catalogs/prices/services on Web	7%	12%	22%
Complete sales and/or purchases with online payment	4%	8%	14%
Use Internet for inventory control and management	5%	6%	10%
Use Internet for customer information and support	13%	11%	33%
Use Internet to take/provide educational services	8%	14%	21%

When asked about specialized skills required to more effectively use Internet strategies, the larger companies were more likely to look for those skills in the business itself, and depend relatively less on community-based resources (even though that was still considered to be the largest pool of such resources). Table 13 shows the smallest firms are very dependent upon their community for the required skills.

Table 13 also shows that the larger companies perceived that both the intellectual and technical infrastructure was more adequate. The bottom panel does show that the technology infrastructure represents a bigger challenge for firms of all sizes. Even though Table 13 shows that the larger firms are relatively better served than the smaller firms, for most services, less than 20% of all respondents believed that those services were "very adequate".

Finally, Table 13 seems to indicate that the intellectual infrastructure (top panel) is more robust than the technical infrastructure (bottom panel) no matter the size of firm.

TABLE 13

**Source of Specialized Skills and Technology
Required for Successful Internet Business Strategies
By Firm Size**

Question: Successful Internet business strategies require specialized skills. Do you have access to someone with the following specialized skills?

Specialized Skill	Gross Sales in 1999					
	← Less than \$100,000		\$100,000-\$499,999		→ \$500,000 or more	
	Skills Availability		Skills Availability		Skills Availability	
	In Business	In Community	In Business	In Community	In Business	In Community
Conceptualizing Web site attributes	4%	58%	12%	52%	34%	39%
Developing a basic Web site	6%	58%	12%	55%	32%	46%
Programming Web based applications	4%	59%	12%	53%	25%	45%
Developing graphics for the Internet	3%	56%	9%	54%	32%	40%
Graphic animation	1%	56%	5%	50%	22%	44%
Developing security services for online transactions	0%	54%	7%	46%	22%	39%
Making electronic payments	1%	53%	8%	46%	31%	31%

Question: How adequate are the resources available to your business in the following areas?

Technology	Less than \$100,000		\$100,000-\$499,999		\$500,000 or more	
	Technology Availability		Technology Availability		Technology Availability	
	Somewhat	Very	Somewhat	Very	Somewhat	Very
Technology infrastructure	13%	8%	25%	14%	38%	15%
Bandwidth/Internet access speed	14%	9%	29%	10%	33%	14%
Web development professionals	24%	15%	29%	15%	45%	14%
Internet access providers	25%	27%	30%	31%	40%	35%
Electronic banking availability	23%	21%	24%	24%	41%	25%
Educational opportunities about IT	25%	16%	30%	17%	47%	12%
Hardware/software suppliers	24%	24%	39%	21%	43%	27%
Infrastructure support personnel	18%	11%	31%	12%	39%	16%

Findings - by Level of IT Expertise in Business

The respondents were asked, "How would you describe your business's level of expertise with computers and other information technology?" Only 18.7% described their businesses as essentially non-users of information technology today.

Level of IT Use/Sophistication within Business	
Non-user	18.7%
Basic/Elementary User	25.9%
Intermediate User	36.3%
Proficient User	19.2%

As expected, by practically every measure, the projected future use and general understanding of the issues, barriers and opportunities were viewed substantially different for firms that are non-users of Information technology compared to firms that viewed themselves as proficient users. An illustration of the extremes between 70 firms that are non-users and 72 firms that are proficient users of IT is shown in Table 14.

TABLE 14**Relative Use of IT Between Non-Users and Proficient Users**

Question: How extensively does your business currently use a computer or other information technology for the following business practices?

Business Practice	Non-users %Don't Use	Proficient Users %Don't Use
Use Computer For		
Use for general correspondence	97%	6%
Record keeping/accounting/payroll	91%	1%
Internet access	98%	17%
Internet		
E-mail	99%	20%
Information and research	95%	20%
Promote business	97%	40%

Question: Are you considering using IT to expand and/or restructure business?

YES	18%	65%
NO	82%	35%

When asked if bandwidth was a problem, no non-users felt it was a barrier to their business while 30% of the proficient users viewed it as a barrier.

Summary and Conclusions

Nebraska business owners and managers are currently using computer technologies for a variety of business applications. Meanwhile, Internet technologies have been rapidly embraced - particularly for e-mail, information and research, and for web sites to promote business. While there are more businesses not using Internet technologies to address selected business practices, this 5-year old technology is probably being embraced by Nebraska businesses faster than any previous tool affecting business practices.

Many of the computer-based business solutions are more "mature" and have been employed for several years. Computer-based record keeping, accounting and payroll software exist for every industry, size of business and budget. Likewise, desk top software, including word processing, desktop publishing, spread sheets, database, etc., are currently widely used and growing. This growth is driven by increased function, lower cost of equipment and software, ease of use, etc. Also, networking technologies (both local area and wide area) have increased functionality within the business with multiple workstations and/or multiple business sites.

Meanwhile, there are generally sufficient numbers and quality of suppliers and service support for PC devices to meet local business needs in most communities. The intellectual infrastructure is growing within the community through college programs, various technology vendors, training from a variety of sources, online help functions, an educated population, a larger base of experienced users, etc.

Finally, the technical infrastructure for computer-based technologies is largely controlled by the firm. Firms buy the equipment and devices they need to create their operating environment. The combination of hardware vendors, software vendors and the firm's employees can create a relatively self-contained computer environment for the firm.

Conversely, the intellectual and technical infrastructure for the Internet is clearly not as "mature." While some Internet-based business functions are readily accessible and easy to use, others are not.

- Some applications like e-mail are readily available and easily implemented.
- Information and research is readily available. However, a higher degree of study and practice is required to become highly proficient.
- Many web applications and business solutions are immature, including:
 - catalog posting
 - payment systems
 - security solutions
 - banking solutions
- Web development varies from relatively primitive solutions to highly sophisticated sites. The most primitive web sites simply state, "I'm here" and are relatively easy to create. Meanwhile, industrial strength 7 (day) by 24 (hours per day) solutions that attract the desired activity are frequently very sophisticated, technically eloquent and professionally developed.

Generally, it will be some time before mature Internet-based industry and enterprise solutions are available "off the shelf." For many business applications and processes, Internet solutions are changing so quickly that "off the shelf" applications simply will not be available for years.

Not only must the business find the right application and balance of these new Internet-based technologies in their firms, they must also deal with an "immature and emerging"

technical infrastructure within their community or region. In large metropolitan areas in the U.S., both the technical infrastructure and intellectual infrastructure are relatively robust. But even in these regions, the pace of change in the technologies and business strategies create gaps in service, uneven capabilities and great business risk associated with business solutions that may not be sustainable over time. The E-world is not stable and mature even in large metropolitan areas.

The challenge is even greater in rural areas. Certainly, robust bandwidth/line speeds are slower coming and frequently more costly than markets that are highly populated. To state the obvious, every market uncertainty of urban markets also apply to the small business that invests in Internet-based business solutions for its firm.

Despite the uncertainty, however, only 18.7% of Nebraska business leaders responding to the survey stated they were non-users of information technology. That means over 80% use the technology. For the Internet, only 39.7% of businesses have connected to the Internet. That means over 60% presently use the Internet.

When looking at the following data, one must conclude Nebraska citizens and businesses are about to hit "critical mass" on the use of Internet technologies. Once that "critical mass" is hit, there is likely to be profound implications to business and commerce as electronic alternatives become the norm for numerous business operations and social activities. Some examples are already evident. E-mail is changing the way people communicate in business and increasingly in society.

Rural Nebraskans' Use of the Web

Nebraska business using computer technologies	78.6%
Nebraska business connected to the Internet	58.4%
Nebraska business owners/managers with computers in their home	70.5%
Nebraska business owners/managers connected to the Internet access in their home	61.1%
Nebraska business using e-mail	57.9%
Nebraska households connected to the Internet	37.0%
Nebraska rural households that purchased goods and services using the Internet this last year	29.0%

Job recruiting sites have profoundly affected the way firms announce openings, and applicants' search for positions. The array of services available over the Web now touches every aspect of society from education, research, shopping, entertainment, music, political campaigns, news, maps, faith, etc. To illustrate, a Blair, NE minister has more "subscribers" (600+) to his Internet-based daily devotions than church

attendees (500+) on Sunday morning. And, his "Internet congregation" covers several states and foreign countries.

While Nebraska businesses have strongly embraced information technologies, there are some emerging business practices which are minimally used. These technologies include:

- Using Internet to promote business.
- Using Internet to link vendors and suppliers.
- Posting catalogs/prices/services on the Web.
- Completing sales/purchases with online payments.
- Online banking and financial services.
- Using Internet for inventory control and management.
- Using Internet for customer information and support.
- Using Internet to take/provide educational services.

These, and other Web-based services, are also in their infancy for businesses across the country. They are also applied unevenly from firm to firm and industry to industry. The study suggests that additional insight and understanding how and when to embark on such strategies is required. Since 41% of all business are considering using information technology to expand or restructure their future business, obviously many business managers have started that strategic thinking. Since 56% of the respondents are interested in learning how to use information technology in their business practice, well designed programs focused on strategic use of information technologies would be well received by Nebraska business owners and operators.

Finally, it is important that all citizens of Nebraska have access to and knowledge of how to use information technologies. The state schools, libraries, private providers, Internet service providers, and others are doing an excellent job in this educational endeavor. Nebraska is ahead of the pack by some measures, i.e.; computers and Internet connected schools. Nebraska is in the middle of the pack by other measures

also (37% of homes have connected to the Internet compared to 41.5% nationally). The state is well-positioned to have an informed and participative population in the emerging E-world.

From an economic development perspective, it is absolutely critical that Nebraska business and entrepreneurs have the access and knowledge to use information technology to remain competitive and expand market opportunities. It is the current and future businesses that will provide the employment opportunities and become the engine for economic growth. These businesses, from agricultural to zoological endeavors, must remain competitive. The emerging, networked/E-world creates enormous opportunities for Nebraska business to grow. These same conditions create an opposite risk as they lose market shares to new cyber competitors.

Growth in the intellectual infrastructure must be robust and World Class at both the community level and state level. All segments of the society - private sector, government and education - must have perspective that fosters opportunities for Nebraska employers to gain the knowledge and strategic thinking required.

The technical infrastructure must also grow in capacity as rapidly as market requirements expand and competitive regions develop. Unfortunately, capacity and availability of the core communications technologies are largely outside the control of individual Nebraska consumers and businesses. Growth in this infrastructure rests with various providers, and will be influenced by the unique requirements to provide services to low-density population areas, regulatory policies and various public policy considerations. These issues are beyond of scope of this study, "The 'Other' Digital Divide" by the Center for the New West, provides an excellent review of these issues.⁹"

What It Means (Recommendations)

To Business

- Start using IT if you haven't already started.
- Increase your use of computer and technologies.
- Increase your understanding of the emerging E-world, no matter your current level of usage and understanding.
- Go to the next level of Web strategies if you are now engaged.
 - If not on Internet → go to Internet
 - If E-mail user only → create initial web site
 - If web site is not comprehensive → create more robust site
 - etc. → etc.
- View Web World from:
 - market perspective
 - cost containment/operational perspective
 - defensive perspective (to save present markets)
 - new product/service potential
 - strategic vs. operational perspective

To the Community

Communities should seek to serve existing enterprises while attracting and serving future enterprises that provide the intellectual and physical infrastructure required by

⁹ The "Other" Digital Divide; Burgess, Philip M. and Raitano, Florine P.; Center for the New West; Special Report, September 1999 Online Edition; Denver, Colorado; www.newwest.org.

the emerging E-world. Institutions and firms must be supported and/or attracted

include:

- Educational institutions (both secondary and postsecondary) with relevant and robust curriculum (from desktop proficiencies through advanced technical/business/E-business offerings).
- Private educational and service providers from basic tutorial programs, hardware, Web design, Internet service providers, graphic specialists, etc.
- Work with vendors to assure bandwidth and other key infrastructure is available at competitive prices.
- Work to help aggregate demand to accelerate cost-effective installation of required technical infrastructure.
- Work with local and state policy makers to assure tax law, regulatory policies, and other law and practices do not disadvantage Nebraska business.
- Work with local financial institutions and other firms to assure E-based services are available to local businesses and consumer customers.
- Create or gain access to quality and relevant tutorials, courses and programs that target the strategic application of information technologies for business and entrepreneurial leaders.

Appendix A

*Nebraska's Electronic Main Street:
A Survey of Business Technology Use*

Summer 2000



Conducted by:
Center for Applied Rural Innovation
University of Nebraska-Lincoln • Lincoln, NE 68583-0947

About Your Business

Q1. What is the nature of your business? *Circle the number of the correct answer.*

- 1 Agriculture, forestry and fisheries
- 2 Construction
- 3 Manufacturing
- 4 Transportation, communications
- 5 Wholesale trade
- 6 Retail trade
- 7 Finance, insurance, real estate
- 8 Business and repair services
- 9 Personal services
- 10 Entertainment & recreation services
- 11 Professional & related services
- 12 Other: _____

Q2. Do you own, operate or manage this business? *Circle the number of the correct answer.*

- 1 Yes) ***If yes, for how many years?*** _____
- 2 No

Q3. Where is this business located? *Circle the number of the correct answer.*

- 1 On your farm
- 2 Your home (non-farm)
- 3 In a retail office space or manufacturing site
- 4 Other: _____

Q4. What is the size of your community (or nearest community)? *Circle the number of the correct answer.*

- 1 Less than 500
- 2 500 - 999
- 3 1,000 - 4,999
- 4 5,000 - 9,999
- 5 10,000 - 19,999
- 6 Over 20,000

Q5. How many people does this business employ, including yourself?

_____ people

Q6. Please indicate your business's gross annual sales for 1999. Circle the number of the correct answer.

- 1 Less than \$25,000
- 2 \$25,000 - \$49,999
- 3 \$50,000 - \$99,999
- 4 \$100,000 - \$199,999
- 5 \$200,000 - \$299,999
- 6 \$300,000 - \$399,999
- 7 \$400,000 - \$499,999
- 8 \$500,000 or above

Technology in Your Business

The following questions deal with the use of computers and other information technology in your business.

Q7. Are the following technologies used in your business? Circle YES or NO for each.

- | | | |
|---------------------------------|-----|----|
| a. Computer | Yes | No |
| b. Internet access | Yes | No |
| c. A Web site for your business | Yes | No |
| d. Fax machine | Yes | No |
| e. Cellular phone | Yes | No |

Q8. How would you describe your business's level of expertise with computers and other information technologies? Circle the number of the correct answer.

- 1 Non-user
- 2 Basic/elementary user
- 3 Intermediate user
- 4 Proficient user

Q9. How extensively does your business currently use a computer and other information technology for the following business practices?

Circle the number of the correct answer for each line.

	Don't Use	Limited Use	Use Moderately	Use Extensively
<i>Computer</i>	0	0	0	0
a. General correspondence/communication	1.....	2.....	3.....	4
b. Record keeping/accounting/payroll	1.....	2.....	3.....	4
c. Database management	1.....	2.....	3.....	4
d. Internet access	1.....	2.....	3.....	4
e. Process and manufacturing	1.....	2.....	3.....	4
f. Developing presentations, marketing and sales materials	1.....	2.....	3.....	4
g. Web application development/hosting	1.....	2.....	3.....	4
<i>Internet</i>				
h. Using e-mail	1.....	2.....	3.....	4
i. Using the Internet for information and research	1.....	2.....	3.....	4
j. Using the Internet to promote your business	1.....	2.....	3.....	4
k. Using the Internet to link vendors and suppliers	1.....	2.....	3.....	4
l. Posting catalogs/prices/services on the Internet	1.....	2.....	3.....	4
m. Completing sales and/or purchasing with online payments	1.....	2.....	3.....	4
n. Online banking and other financial services	1.....	2.....	3.....	4
o. Using the Internet for inventory control and management	1.....	2.....	3.....	4
p. Using the Internet for customer information and support	1.....	2.....	3.....	4
q. Using the Internet to take or provide educational services	1.....	2.....	3.....	4
<i>Communications and Networking</i>				
r. 800 numbers	1.....	2.....	3.....	4
s. Local area network	1.....	2.....	3.....	4
t. Wide area network	1.....	2.....	3.....	4
u. Cellular phones	1.....	2.....	3.....	4
v. Palm pilots	1.....	2.....	3.....	4

Q10. How important will using a computer and other information technology for the following business practices be to the future of your business?

Circle the number of the correct answer for each line.

	Not Important	Somewhat Important	Very Important
	0	0	0
Computer			
a. General correspondence/communication	1	2	3
b. Record keeping/accounting/payroll	1	2	3
c. Database management	1	2	3
d. Internet access	1	2	3
e. Process and manufacturing	1	2	3
f. Developing presentations, marketing and sales materials	1	2	3
g. Web application development/hosting	1	2	3
Internet			
h. Using e-mail	1	2	3
i. Using the Internet for information/research	1	2	3
j. Using the Internet to promote your business	1	2	3
k. Using the Internet to link vendors & suppliers	1	2	3
l. Posting catalogs/prices/services on the Internet	1	2	3
m. Completing sales and/or purchasing with online payments	1	2	3
n. Online banking and other financial services	1	2	3
o. Using the Internet for inventory control and management	1	2	3
p. Using the Internet for customer information and support	1	2	3
q. Using the Internet to take or provide educational services	1	2	3
Communications and Networking			
r. 800 numbers	1	2	3
s. Local area network	1	2	3
t. Wide area network	1	2	3
u. Cellular phones	1	2	3
v. Palm pilots	1	2	3

Q11. Are you considering using information technology to expand or restructure your business in the future? *Circle the number of the correct answer.*

- 1 Yes
- 2 No (*Go to Q13*)

Q12. If yes, what areas will create the greatest challenges for you as you expand or restructure your business using information technology? *Circle all that apply.*

- 1 Understanding how my industry is using the Internet
- 2 Understanding the opportunities available via the Internet
- 3 Understanding regional/national/global Internet markets
- 4 Restructuring your business around the Internet
- 5 Using the Internet to manage costs/expand revenues
- 6 Financing Internet ventures
- 7 Developing a business strategy for electronic commerce
- 8 Understanding elements of a business plan
- 9 Developing a business plan
- 10 Other: _____

Q13. Is there a nearby organization or institution which provides education or training on how to use a computer and other information technology in your business? *Circle the number of the correct answer.*

- 1 Yes
- 2 No
- 3 Don't know

Q14. Are you interested in learning how to use a computer and other information technology in your business practices? *Circle the number of the correct answer.*

- 1 Yes
- 2 No (*Go to Q20*)

Q15. What price would you consider reasonable for a 1 day training course on how to use a computer and other information technology for your business?

\$ _____

Q16. How many miles are you willing to travel (one way) to attend training on using a computer and other information technology for your business?

_____ miles, one way

Q17. How comfortable would you be using the following delivery options for training on how to use a computer and other information technology for your business? Circle the number of the correct answer for each line.

	Not at all Comfortable 0	Somewhat Comfortable 0	Very Comfortable 0
a. Interactive TV classrooms using satellite delivery	1	2.....	3
b. The Internet	1	2.....	3
c. Video tapes	1	2.....	3
d. CD-ROM	1	2.....	3
e. Traditional classroom	1	2.....	3
f. Other (please specify): _____	1	2.....	3

Q18. Which of the following are the best times for you to participate in training courses? Circle all that apply.

- 1 8 a.m. to noon
- 2 Noon to 4 p.m.
- 3 4 p.m. to 8 p.m.
- 4 8 p.m. to midnight
- 5 Other (please specify): _____

Q19. From which of the following sources do you learn about various training programs available in your area? Circle all that apply.

- 1 Local newspaper
- 2 Regional/statewide newspaper
- 3 Magazine/newsletter
- 4 Direct mail
- 5 Word of mouth
- 6 Small business resource
- 7 The Internet
- 8 Other (please specify): _____

Technology Resources in Your Community

Q20. Successful Internet business strategies require specialized skills. Do you have access to someone with the following specialized skills?

Please indicate where this skill is available. If the skill is not available to you, please check the box.

	This skill is not available	I have this skill	Someone else in my business does	Someone in my community does it
	0	0	0	0
a. Conceptualizing Web site attributes	<input type="checkbox"/>	1	2	3
b. Developing a basic Web site	<input type="checkbox"/>	1	2	3
c. Programming Web based applications	<input type="checkbox"/>	1	2	3
d. Developing graphics for the Internet	<input type="checkbox"/>	1	2	3
e. Graphic animation	<input type="checkbox"/>	1	2	3
f. Developing security services for online transactions	<input type="checkbox"/>	1	2	3
g. Making electronic payments	<input type="checkbox"/>	1	2	3
h. Other (please specify): _____	<input type="checkbox"/>	1	2	3

Q21. How adequate are the resources available to your business in the following areas? *Circle the number of the correct answer for each line.*

	Don't Know	Not at all Adequate	Somewhat Adequate	Very Adequate
	0	0	0	0
a. Technology infrastructure	<input type="checkbox"/>	1	2	3
b. Bandwidth/Internet access speed	<input type="checkbox"/>	1	2	3
c. Web development professionals	<input type="checkbox"/>	1	2	3
d. Internet access providers	<input type="checkbox"/>	1	2	3
e. Electronic banking availability	<input type="checkbox"/>	1	2	3
f. Educational opportunities about information technology	<input type="checkbox"/>	1	2	3
g. Hardware/software suppliers	<input type="checkbox"/>	1	2	3
h. Infrastructure support personnel	<input type="checkbox"/>	1	2	3
i. Other (please specify): _____	<input type="checkbox"/>	1	2	3

Q22. Is bandwidth a barrier for your business plans today? *Circle the number of the correct answer.*

- 1 Yes
- 2 No
- 3 Don't know

About You

The following questions are about you. Your answers are completely confidential.

Q23. What is your age?

_____ years

Q24. What is your gender? *Circle the number of the correct answer.*

- 1 Male
- 2 Female

Q25. What is your marital status? *Circle the number of the correct answer.*

- 1 Married
- 2 Single
- 3 Divorced/separated
- 4 Widowed

Q26. What is your highest level of formal education? *Circle the number of the correct answer.*

- 1 Less than 9th grade
- 2 9th to 12th grade (no diploma)
- 3 High school diploma (or equivalent)
- 4 Some college, no degree
- 5 Associate degree
- 6 Bachelors degree
- 7 Graduate or professional degree

Q27. Do you use the following technologies in your home? *Circle YES or NO for each.*

- | | | |
|--------------------|-----|----|
| a. Computer | Yes | No |
| b. Internet Access | Yes | No |

Q28. How would you rate your skill level in using the following tools? *Circle the number of the correct answer for each line.*

	Do not do	Beginner	Intermediate	Expert
	0	0	0	0
a. Using computer hardware	<input type="checkbox"/>	1.....23	
b. Using software packages	<input type="checkbox"/>	1.....23	
c. Computer programming	<input type="checkbox"/>	1.....23	
d. Computer networking	<input type="checkbox"/>	1.....23	
e. Using e-mail	<input type="checkbox"/>	1.....23	
f. Using the Internet for research/business	<input type="checkbox"/>	1.....23	
g. Creating/maintaining a web site	<input type="checkbox"/>	1.....23	

Q29. Have you attended a computer training course in the past three years?

- 1 Yes
- 2 No

Q30. Would you like a copy of the survey results?

- 1 Yes
- 2 No

If yes, please provide the following:

Name: _____

Address: _____

City: _____ Zip Code: _____