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**Assessment of and Strategies for  
Enhancing E-commerce  
in Rural Pennsylvania**

*THE CENTER FOR*



*Rural Pennsylvania*

*A Legislative Agency of the Pennsylvania General Assembly*



# **Assessment of and Strategies for Enhancing E-commerce in Rural Pennsylvania**

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July 2003

This project was sponsored by a grant from the Center for Rural Pennsylvania, a legislative agency of the Pennsylvania General Assembly.

The Center for Rural Pennsylvania is a bipartisan, bicameral legislative agency that serves as a resource for rural policy within the Pennsylvania General Assembly. It was created in 1987 under Act 16, the Rural Revitalization Act, to promote and sustain the vitality of Pennsylvania's rural and small communities.

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## INTRODUCTION

Pennsylvania's economy remains influenced by businesses that belong to "old economy" industries such as mining and manufacturing, which have experienced insignificant growth or decline in the recent past. According to the 1999 State New Economy Index, published by the Progressive Policy Institute, Pennsylvania ranked 24<sup>th</sup> among all states on the progress of adapting to "the new economic order." To experience significant economic expansion, rural parts of the commonwealth need to rapidly adapt to the "new economy" by using technology. However, this adaptation will not be smooth and far-reaching unless small businesses, which constitute about 90 percent of all businesses in rural Pennsylvania as reported by the Center for Rural Pennsylvania, participate actively in e-commerce.

### Background

In spite of the recent economic downturn, the U.S. Census Bureau reports that retail e-commerce sales in the U.S. during the fourth quarter of 2001 totaled more than \$10 billion, representing slightly more than 1 percent of the country's total retail sales of \$860 billion. These e-commerce figures are the highest ever, by a margin of over \$1.1 billion, since the bureau began keeping such records in late 1999. Moreover, while total retail sales in the U.S. were up only 5.3 percent from the fourth quarter in 2000, e-commerce sales saw a 13 percent increase (Clark, 2002). Long (1999) reports the findings from a 1999 Computer Reseller News survey that show that although 55 percent of the small businesses polled (mostly with 25 or fewer employees) were using the Internet for business, most of them may still be in the "feeling out" stage in terms of e-commerce.

Wallace (2000) discusses the lack of diverse routes in rural areas of the country through separate switching links to AT&T, MCI, cable and wireless. This lack of alternate switching links is a drawback for these rural businesses since their websites will not have the highest level of availability. Several businesses have started providing web-based services

and solutions for small businesses (Campbell, 2000; Greco, 2000; Kovar, 2000; Wallace, 2000). However, many of these businesses focus their activities on high-tech areas such as Seattle and San Francisco (Rosa, 2000).

Many countries in the world and states in the U.S. are encouraging e-commerce activity by providing tax breaks. For instance, Singapore is developing infrastructure, providing education, and creating an e-savvy culture (Prabhu, 1999). Canada is developing a unique relationship between the government's space agency and Telesat Canada, which will enable Telesat to support initiatives such as e-commerce through its satellite services to citizens in urban, rural and remote communities in the country (Carroll, 2000). The Australian federal and state governments, in partnership with industry, are encouraging the use of e-commerce among small and medium enterprises through a combination of training and awareness programs and access to web-based information resources.

### Goals and Objectives

To study the use of e-commerce in rural Pennsylvania, the Center for Rural Pennsylvania sponsored this research project in 2001. The specific goals of the project were to assess the level of e-commerce used by small businesses in rural Pennsylvania; understand the perception and readiness of entrepreneurs and small business owners pertaining to e-commerce; assess the infrastructure needs of small businesses; and make policy recommendations to relevant government agencies and departments that can help enhance e-commerce activity in rural Pennsylvania.

### Research Methodology

To gather data, a comprehensive mail survey was sent to a stratified sample of 5,000 small businesses. The stratification was done regionally and on industry categories. Software was used to identify the total number of businesses in each region and industry

category and, subsequently, a proportionate number of surveys in each region and each industry was sent out to randomly selected small businesses in Pennsylvania. The survey was sent to 4,000 rural businesses and 1,000 urban businesses to study potential differences among rural and urban businesses. The final response rate was 7.5 percent (n=368).

The survey focused on the assessment of the level of e-commerce used by small business and on perceptions and readiness of entrepreneurs and small business owners pertaining to e-commerce.

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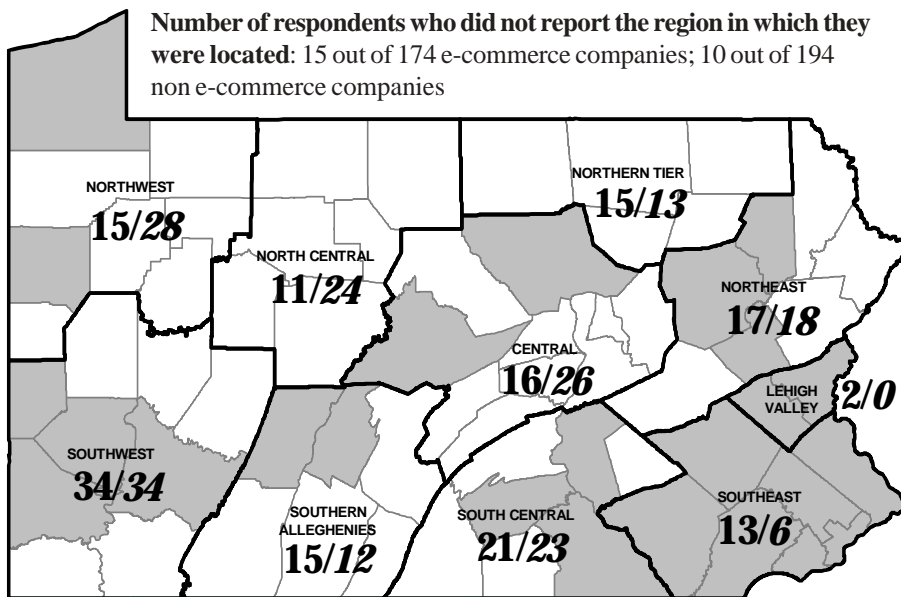
In addition to the mail survey, telephone and in-person interviews were conducted with small businesses that have successfully deployed e-commerce and with telecommunication businesses to address the level of e-commerce use, perceptions of small business owners pertaining to e-commerce, and infrastructure needs. Twelve such businesses were identified with the help of Small Business Development Centers (SBDCs) and local development districts (LDDs); the questions were posed to the small business owners and/or top managers.

To gather existing secondary data pertaining to e-commerce and this project, the researchers reviewed

catalogs, brochures and websites of the State System of Higher Education universities and Pennsylvania State University to determine the courses, degrees, certificates, and continuing education programs pertaining to e-commerce. They also explored journals, magazines and web sites to identify research pertaining to technical infrastructure, human resource infrastructure and benchmarking.

Finally, the researchers conducted a focus group of policymakers, including state legislators, representatives from the state Department of Community and Economic Development, county planning offices, e-commerce experts, a business college dean, small business owners, venture capital experts and technology experts. The purposes of the focus group were to discuss the research findings pertaining to e-commerce deployment in rural Pennsylvania; have an interactive dialogue (on relevant e-commerce issues) among a diverse, knowledgeable and influential group of individuals; and to devise strategies to develop policy recommendations for pertinent agencies and departments of the commonwealth to enhance e-commerce activity in rural parts of the state.

**Map 1: E-commerce/Non E-commerce Businesses by Region**



Note: Team Pennsylvania regions were used for the research.

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## RESULTS

Of the 368 small businesses that responded to the survey, 280 were located in rural counties and 63 in urban (25 did not report their location). One-hundred-seventy-four reported as e-commerce businesses and 194 as non e-commerce businesses with 11 out of the 174 e-commerce businesses identifying themselves as purely dot com in nature, or companies whose products or services are sold solely on the Internet. Fifty-nine of the 174 e-commerce businesses used third-party web-hosting services. Response rates were similar for both urban and rural counties. Although there were more respondents from the western part of the state, there was a significant response from most regions of the state (See Map 1 on page 4).

The percentage of respondents in each industry category matched closely with the percentage of surveys sent to each industry category. Services was the largest sector with 28 percent of respondents. Wholesale; agriculture; finance, insurance and real estate (FIRE); transportation and utilities; and mining each had less than 10 percent (See Figure 1 below).

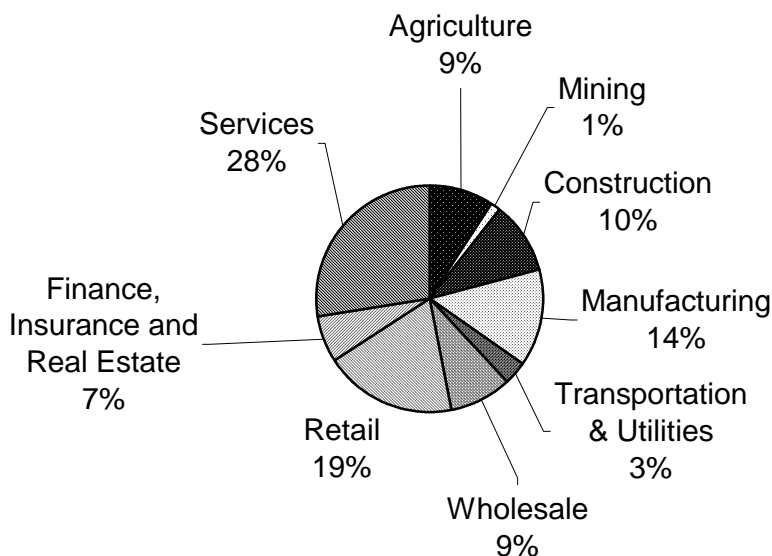
Before discussing the results and analysis in detail, it is important to address the sample size and the response rate. The overall sample size is sufficient to make statistically significant conclusions. Specifically, the sample size in the current study is 368. As a result, for all questions that result in percentages or proportions (from questions that typically have “yes” or “no” choices)—there is a maximum of  $\pm 5$  margin of error at 95 percent confidence. Similarly, for a scaled response ranging from 1 to 5 (“strongly disagree” to “strongly agree”), the population mean will be within  $\pm 0.1$  of the sample mean at 95 percent confidence.

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Nearly 50 percent of the overall respondents’ businesses engage in some type of e-commerce. Due to the nature of the survey, the businesses that engage in e-commerce were more inclined to answer although there were clear instructions on the survey that it was meant for all businesses even if they were not engaging in e-commerce. However, this inherent propensity of the e-commerce businesses to fill out

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**Figure 1: Respondents by Industry**



**Table 1: Type and Extent of E-commerce Activity**

Activity	Extent of Activity (percentages)				Total # of Respondents
	None	Low	Med	High	
Advertising/promoting	21.2	27.9	24.8	26.1	165
Selling/buying	11.4	43.4	25.3	19.9	166
Customer service	27.3	30.4	24.2	18.0	161
Accounting/payroll	59.1	23.8	7.9	9.1	164
Warehousing/inv.control	78.7	8.5	11.0	1.8	164
Recruiting and training	61.3	27.0	9.2	2.5	163
Electronic Data Interchange	31.1	24.2	21.2	23.6	161
Conducting research	28.8	26.4	26.4	18.4	163

the survey was expected and so no conclusion on the overall percentage of businesses in the state engaging in e-commerce can be made. Among e-commerce businesses that responded to the survey, it was interesting to note that there was no pattern in the use of e-commerce in different regions. For example, even in the very rural regions of north central Pennsylvania and across the northern tier, 31 percent and 54 percent of respondents, respectively, were e-commerce businesses.

### Urban/Rural E-commerce Businesses

According to the survey results, it is clear that there is more e-commerce activity in urban counties than in rural counties. While 43 percent (n=122) of the rural respondents engaged in e-commerce, 58 percent (n = 37) of the urban respondents did so. It is also evident that e-commerce is more prevalent in manufacturing; service; and FIRE than in other sectors. The agricultural sector is far behind all other sectors in engaging in e-commerce. The percentage of respondents reporting e-commerce activity ranged from 40 percent to 61 percent in all industry categories except in the agricultural sector where the percentage was only 12.

A word of caution: the sample sizes for certain demographic categories (counties, certain industry categories) may not be sufficient to make statistically significant conclusions. For example, an analysis cannot be done for individual counties and the 10 individual regions because of small sample sizes in these categories. However, the analyses conducted for urban vs. rural businesses and e-commerce vs. non e-commerce businesses are meaningful since the sample sizes in these categories are sufficiently large.

### Type and Extent of E-commerce Activity

Mainly, respondent businesses are engaging in the marketing aspects of e-commerce such as advertising, selling, and customer service; in electronic data interchange; and in conducting research. Table 1 shows the extent of e-commerce activity of different types.

### Reason for Deploying E-commerce and Resulting Benefits

The top reasons to initially deploy e-commerce and the top benefits of doing so are almost identical. Statistical analysis confirmed that businesses that had

**Table 2: Reason for Initially Deploying E-commerce and Benefits**

Initial reason for deploying e-commerce	# of businesses citing reason	Percent of businesses reporting medium and high benefit
Flow of Information	54	79 percent
Organization Image	28	61 percent
Productivity	24	56 percent
Responsiveness to customer needs	14	53 percent
Quality of products/services	17	45 percent
Access to new markets	18	44 percent
Increased sales	25	43 percent

identified a specific initial reason for deploying e-commerce reaped greater corresponding benefits in that category. For example, 54 businesses reported “improved flow of information” as an initial reason to deploy e-commerce, and the average benefit reported by these businesses was 2.5 on a scale of 1 to 4. On the other hand, the 120 businesses that did not report “improved flow of information” as an initial reason for deploying e-commerce reported an average benefit of 1.95.

**Reasons for Not Engaging in E-commerce**

Businesses that did not engage in e-commerce most often indicated that it was “strategically not important for their business.”

Other major reasons were uncertainty of the Internet’s performance, reliability and security; lack of affordable technical infrastructure; and lack of knowledgeable and skillful workforce. There was no major difference between rural and urban businesses on these reasons.

**Internet Connection Needs**

Respondents were asked to indicate their needs with respect to Internet connections starting from simple dial-up capability to T1/T3 lines. It was surprising that 58 percent of the respondents simply wanted dial-up service. This is probably because a large majority of them use third-party web hosting services and may not need a broadband Internet connection at their own business site. Since the respondents were allowed multiple responses on this question, it was important to determine if the Internet connection requirements of each individual small business were adequately met. To accomplish this, an increasing set of weights was assigned to various connection types from dial-up to T1/T3. These weights were used on both the “really need” and

**Table 3: Internet Connection Needs**

	Dial-up	ISD	DSL Cable	Satellite	T1/T3
Really Need	58%	12%	20%	5%	14%
Currently Have	10%	2%	26%	6%	15%

Note: Totals do not add up to 100 due to multiple responses in the *Really Need* section and no response in the *Currently Have* section.

“currently have” responses to check if the overall connection needs were met. Based on that, 45 percent of the businesses employing e-commerce report that they do not have an adequate Internet connection.

Businesses with adequate Internet connections and those without have similar perceptions regarding the affordability, adequate availability, expandability, and security of their Internet connection, but have significantly different perceptions of adequate bandwidth. The issue of inadequacy of bandwidth was mentioned by small business owners during interviews and is described later in this report.

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**Awareness of E-commerce Legal Issues**

Results of a simple “quiz” on e-commerce legal issues showed that there was a general lack of awareness about the legality of e-signatures and taxation of e-commerce. (See Table 4 below.)

**Analysis of Perceptions on Various Topics**

The survey addressed the perceptions of businesses in the following areas of e-commerce: Internet security issues; sales tax issues; and human resource infrastructure issues. First, analysis was conducted to determine what categories were perceived to be favorable or unfavorable. Subsequently, an analysis was conducted to determine if there is a significant difference in perception among different types of businesses and from a rural/urban perspective.

**Perception of Internet Security Issues**

EC businesses, in general, perceive the Internet to be more secure than do non-EC businesses but also perceive the threat of hacking to be higher. Among non-EC businesses, rural businesses showed more confidence in security issues than urban businesses.

**Perception of Sales Tax Issues**

Surveyed businesses, in general, are not in favor of taxing e-commerce and do not believe states will lose revenue if e-commerce is not taxed. If e-commerce is taxed, these businesses agree that: tax rules must be standardized; the tax-collection system must be simplified; and mail and telephone orders must be taxed as well.

**Perception of Human Resources Issues**

Businesses, in general, are satisfied with the educational infrastructure for e-commerce in Pennsylvania. EC businesses are more optimistic than non-EC businesses about the capability of the current workforce for e-commerce jobs. However, respondents expressed poor perceptions of recruiting and retaining employees for e-commerce. Urban EC businesses feel that the quality of life in Pennsylvania is good enough to attract skilled people. Rural EC businesses do not feel as strongly about this, but generally agree.

**Table 4: Results of E-commerce Quiz**

Questions/answers		Right	Wrong	Not sure
PA law recognizes and provides legal protection to e-signatures	All businesses	26%	10%	64%
	EC businesses only	36%	7%	57%
Congress imposed a three-year moratorium until October 2001 on the taxation of Internet access and e-commerce	All businesses	31%	5%	64%
	EC businesses	41%	3%	56%

## The Small Business Interviews

As mentioned earlier, a dozen in-depth interviews with small business owners and/or managers were conducted. Small businesses that participated in the interviews included a travel agency, a manufacturer of home construction products, a custom deck installation firm, an auction house, an educational software company, a printing business, a custom manufacturer and an office furniture retail store.

The interviews ranged from 45 to 90 minutes and provided an opportunity to explore and probe into the reasons for success or failure of e-commerce businesses in rural Pennsylvania as well as into the perceptions of the small business owners/managers towards aspects of e-commerce. The results of the interviews are as follows.

- Most of those interviewed related success and failure to these two “basics:”
  1. The need to understand important business implications before engaging in e-commerce.
  2. The need to perform a cost-benefit analysis and take appropriate steps.
- Top management commitment is important and instrumental.
- Owners and top managers in successful e-commerce businesses are highly motivated, enthusiastic and enterprising individuals who are not intimidated by challenges.
- There is no basic technological barrier to practicing e-commerce. Technology is available and is not extremely expensive, even in rural areas.
- The lack of venture capital was a common theme. There were no specialized venture capitalists in the area. Also, some small business owners said they were approached by venture capitalists who were willing to fund their businesses only if they moved out of Pennsylvania. They also reported anecdotal instances of a few small businesses actually moving to New Jersey and Virginia to receive venture capital.

➤ As a whole, rural Pennsylvania did not have an image of being high-tech. This resulted in many drawbacks:

1. There is no critical mass of small business users of technology infrastructure, which is a disincentive for telecommunications businesses to provide high quality service.
2. Although there are multiple telecommunications businesses serving some areas of rural Pennsylvania, there isn't enough redundancy required for providing uninterrupted service.
3. The bandwidth necessary for web-hosting services is not sufficient in rural Pennsylvania. Hence, a number of businesses have their web hosting services in other places such as Virginia.
4. Since there is no critical mass of businesses hiring high-tech employees, potential employees tend to leave the area. However, none of the interviewed businesses had experienced difficulty in hiring high quality technology employees locally. The owners/managers partially attributed this to the fact that most of their web hosting and other high-tech activities were contracted out (mostly out-of-state or to urban areas such as Philadelphia and Pittsburgh) and they needed only a few high-tech employees. Many of the businesses indicated they would have a tough time recruiting locally if they expanded and needed more than a few high-tech employees.
  - There were excellent public-private partnerships in their region and the Pennsylvania state government is doing a good job in terms of technology and education in the state.
  - Internet security has not been a problem, although some small businesses felt their customers need to be educated that it is safer to deal over the Internet than on the telephone due to absence of human intervention when dealing with confidential information.

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## CONCLUSIONS

### Rural Entrepreneurs

The results of this study show that there is significantly more e-commerce activity in Pennsylvania's urban counties as compared to rural counties. Among the 10 regions of the commonwealth (See Map 1 on page 4), there does not seem to be any particular region in which e-commerce activity is significantly greater. It should be noted that most of the 10 regions are comprised of both rural and urban counties.

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E-commerce is most prevalent in the industry sectors of manufacturing, service and finance, insurance and real estate. The agricultural sector is far behind other sectors in engaging in e-commerce. The majority of e-commerce activity is in marketing and electronic data interchange.

Businesses are reaping their expected benefits from engaging in e-commerce. Improving the flow of information, organization image and productivity were the top three reasons for businesses to engage in e-commerce and these were also the top three benefits

reported. Surprisingly, increased sales and access to new markets were not the most cited reasons.

The top reason for businesses not to engage in e-commerce was that it was "strategically not important for their business." A significantly higher proportion of rural businesses as compared to urban businesses believed that e-commerce was strategically not important for their businesses. This is an important result since many business leaders (practitioners and academics) believe that it is strategically important for every business to have a web-presence and/or use the Internet to enhance its business performance. Also, every small business that was interviewed had engaged in e-commerce successfully and emphasized that it was strategically important for the business. Hence, it may be concluded that most businesses must perform a comprehensive analysis of the strategic importance of e-commerce to their business.

Other major reasons for not engaging in e-commerce were: uncertainty about the Internet's performance, reliability, and security; lack of affordable technical infrastructure; and lack of knowledgeable and skillful workforce. All of these are important reasons that need to be addressed.

From the research, it was obvious that businesses that were successful in e-commerce were caught in a difficult situation. They knew that there were no basic barriers to practicing e-commerce in rural Pennsylvania; technology and human resources are available to engage and even succeed in e-commerce.

However, to go to the next level – to grow and be highly successful – there were a number of barriers including lack of bandwidth, alternate routing, venture capital, and critical mass of businesses engaging in e-commerce that result in a number of related drawbacks including flight of capital and employees from the region.

**“FROM THE RESEARCH, IT WAS OBVIOUS THAT BUSINESSES THAT WERE SUCCESSFUL IN E-COMMERCE WERE CAUGHT IN A DIFFICULT SITUATION. THEY KNEW THAT THERE WERE NO BASIC BARRIERS TO PRACTICING E-COMMERCE IN RURAL PENNSYLVANIA; TECHNOLOGY AND HUMAN RESOURCES ARE AVAILABLE TO ENGAGE AND EVEN SUCCEED IN E-COMMERCE.**

**“HOWEVER, TO GO TO THE NEXT LEVEL – TO GROW AND BE HIGHLY SUCCESSFUL – THERE WERE A NUMBER OF BARRIERS INCLUDING LACK OF BANDWIDTH, ALTERNATE ROUTING, VENTURE CAPITAL, AND CRITICAL MASS OF BUSINESSES ENGAGING IN E-COMMERCE THAT RESULT IN A NUMBER OF RELATED DRAWBACKS INCLUDING FLIGHT OF CAPITAL AND EMPLOYEES FROM THE REGION.”**

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Small businesses successful in e-commerce attribute their success to top management commitment and to performing strategic and cost/benefit analyses pertaining to e-commerce.

### **Perceptions on Regional Issues**

The poor perception of rural Pennsylvania as a high-tech center was given as one of the reasons for the lack of e-commerce activity in the state. The lack of venture capital is another perception that stood out; the non-high-tech image of the region was perceived to be the contributing factor for the lack of venture capital according to those interviewed.

Businesses engaging in e-commerce are generally confident about a safe, secure and reliable Internet for engaging in e-commerce. However, they are still wary of hacking, viruses, and possible loss of data due to poor backup systems. The majority of the businesses believe that taxing e-commerce will impede the growth of e-commerce. They assert that if e-commerce is taxed, tax rules must be standardized and the collection system must be simplified.

Educational institutions at all levels in the region are perceived to be adequate. However, the ability to recruit and retain employees and consultants in rural areas is a challenge. The two major reasons are a perceived “poorer quality of life” and the lack of a critical mass of technology-oriented businesses.

### **Technological Infrastructure**

Based on interviews with telecommunication businesses, direct or leased lines by any of those businesses can serve practically any point in Pennsylvania. The location and type of service dictate the cost. For remote areas, cost becomes prohibitive. Availability of fail over and redundancy in connectivity (alternate routing), which is critical for businesses, is lacking due to low demand volume.

Some of the smaller connectivity providers are worried about monopolies that exist in many markets; hence the small businesses in rural areas feel deprived in terms of receiving competitive prices. Most of the small businesses that were interviewed reported they relied on an outside web-hosting organization to maintain their e-commerce websites. Interestingly, most of these web-hosting companies maintained their servers in northern Virginia and New Jersey, as those areas have a high density of large Internet providers, who guarantee fail over and redundancy in connectivity to ensure constant availability of companies’ websites. Although most of the businesses reported that they require only a dial-up connection to the Internet, 45 percent reported that they do not have an adequate Internet connection.

### **Educational Infrastructure**

Across the state, educational institutions, from community colleges to universities, are offering education in the area of e-commerce and relevant technologies. These educational offerings range from courses to full-fledged graduate degrees in e-commerce.

Most of the interviewed small businesses currently get minimal development work and web-hosting done in their local regions. Consequently, the hiring and training needs for high-tech employees are minimal and easily addressed. However, many interviewees hope this is not going to be a “Catch-22” situation—non-availability of local talent due to the lack of critical mass of opportunity with the lack of critical mass of opportunity due to the lack of availability of local talent.

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## RECOMMENDATIONS

### Develop Training Programs

Many small, rural businesses in Pennsylvania that have successfully deployed e-commerce attribute their success to the vision of entrepreneurs. It is the entrepreneur who has a heightened awareness and sees the opportunity presented by e-commerce and drives the adoption of e-commerce in his/her small business. One key recommendation is to continue educating entrepreneurs, managers, and small business owners about the benefits and opportunities presented by e-commerce. Regional resource centers, Small Business Development Centers, regional planning offices, and chambers of commerce should continue to educate small business owners about e-commerce opportunities. A forum should be developed to share and spread success stories of e-commerce adoption in rural Pennsylvania.

Small to micro businesses in rural Pennsylvania will require more technical assistance in order to become familiar with e-commerce adoption. There-

fore, a training program should be developed that is geared toward small, rural businesses. The above-mentioned entities could be the key players in fulfilling these training needs as well.

A large percentage of small businesses – 70 percent of rural non-ecommerce businesses and 59 percent of urban non-ecommerce businesses – have reported that they have not adopted e-commerce because it does not make strategic sense to them. Many of them may be mistaken and may lack the awareness as to how they can benefit from e-commerce. Again, training and educational programs should be developed to encourage small businesses not to lag behind in e-commerce.

### Encourage Businesses to Enhance Supply Chain Management Capabilities

One area that has tremendous growth potential resulting from e-commerce is efficient supply chain management and its resulting benefits. Small rural businesses, especially in the retail and manufacturing sector, must take part in the anticipated growth of business-to-business (B2B) commerce. To do that, they must engage in supply chain management activities, such as distribution network management, logistics, warehousing and inventory management by using Internet technologies. Yet, the survey results clearly indicate that small rural businesses are not engaging in these activities. Small, rural businesses need to be educated about the potential benefits of B2B commerce and the importance of efficient and effective supply chain management.

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**“**BASED ON INTERVIEWS OF TECHNOLOGY PROVIDERS AND MANY SMALL BUSINESSES THAT HAVE ENGAGED IN E-COMMERCE, IT IS EVIDENT THAT EVERY POINT IN THE COMMONWEALTH HAS SOME LEVEL OF TECHNOLOGICAL INFRASTRUCTURE AVAILABLE THAT PERMITS BUSINESSES TO ENGAGE IN E-COMMERCE.

**“**HOWEVER, IN REMOTE AREAS, IT MAY BE TOO EXPENSIVE. ADDITIONALLY, BARRING THE TWO MAJOR METROPOLITAN AREAS OF PHILADELPHIA AND PITTSBURGH, THERE IS A LACK OF REDUNDANCY AND THE ALTERNATE ROUTING REQUIRED FOR PROVIDING THE GUARANTEED UNINTERRUPTED SERVICE ESSENTIAL FOR ENGAGING IN E-COMMERCE.”

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**“SOME GOVERNMENT INCENTIVE IS ESSENTIAL FOR TELECOMMUNICATION BUSINESSES TO CONNECT RURAL AREAS WITH HIGH BANDWIDTH.”**

### **Develop Technological Infrastructure**

Based on interviews with technology providers and many small businesses that have engaged in e-commerce, it is evident that every area in the commonwealth has some level of technological infrastructure available that permits businesses to engage in e-commerce. However, in remote areas, it may be too expensive. Additionally, barring the two major metropolitan areas of Philadelphia and Pittsburgh, there is a lack of redundancy and the alternate routing required for providing the guaranteed uninterrupted service essential for engaging in e-commerce. There are multiple telecommunication businesses that are serving rural Pennsylvania, but they do not independently own fiber optic cable, rather, they lease from each other as needed.

Some government incentive is essential for telecommunication businesses to connect rural areas with high bandwidth. In fact, there is one such program in existence, the Key-Net Alliance. It was created to ensure that the state’s investments in technology enhance state agencies as well as local communities by bringing strategic advantages to schools and businesses in underserved rural and urban communities so that they may better compete. It is recommended that Pennsylvania state government continue to promote such initiatives to develop the Internet infrastructure. Moreover, if the commonwealth is successful in attracting large businesses to some of the rural areas, the technological infrastructure will catch up more quickly and will benefit surrounding rural areas as well.

In spite of less than adequate technological infrastructure in the rural areas of the commonwealth, small businesses can and do deploy e-commerce by using the so-called third party web-hosting businesses. Typically, these web-hosting companies are located in the Washington, D.C. area. Proximity is not essential; the web-hosting company could be located in any part of the world as long as it has highly developed Internet infrastructure. Many small businesses indicated that they host their “developmental computer server” at their own facility and their “production server” (the real server for hosting their e-commerce activities) with a “web-hosting service provider.” Using this strategy, small, rural-based businesses have been successful in deploying e-commerce.

Is the approach described above sufficient for small businesses? Perhaps, yes. However, as a state legislator pointed out during the focus group discussion: during the late 19th Century, if your town was not on the railroad you were not in the loop. Similarly, if you are not connected to the “thick Internet pipe” (broadband) today, you are out of the loop. If technological infrastructure is sufficiently developed, Pennsylvania will be able to encourage “web-hosting” businesses to mushroom, which in turn would proliferate more e-commerce related businesses.

### **Consider Other Initiatives**

According to the Center for Rural Affairs in Nebraska, government intervention is required to provide universal access. It suggests, among other approaches, establishing a universal access fund (along the lines of the Federal Universal Service Fund — a tax assessed on telephone use).

Nebraska Public Power District (NPPD) has installed a network of fiber across Nebraska by using its network of power lines and towers. Although, NPPD is not allowed to provide Internet services, it

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has developed a network of fiber in the state at a relatively low cost using public money.

In Georgia, the government and a local telecommunications company started an initiative in 2000 to bring “high-speed Internet access to residents in all reaches of the state” under the Business Expansion and Support Act. The new infrastructure initiative was expected to boost economic development in Georgia.

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These and other initiatives may be considered for possible replication in Pennsylvania.

### **Develop Educational Infrastructure**

In spite of the fact that there are numerous colleges and universities in Pennsylvania offering e-commerce education, the state has not become a magnet for high-tech businesses. Since there is no critical mass of businesses hiring high-tech employees, potential job seekers tend to leave the area.

Pennsylvania needs initiatives geared toward developing and delivering short courses to small/micro-businesses that can help them in promoting their products and services on the Internet. This approach will be similar to one in Warwickshire, UK, called WIRED, which offers free consultancy and

**“IF TECHNOLOGICAL INFRASTRUCTURE IS SUFFICIENTLY DEVELOPED, PENNSYLVANIA WILL BE ABLE TO ENCOURAGE “WEB-HOSTING” KINDS OF BUSINESSES TO MUSHROOM, WHICH IN TURN WOULD PROLIFERATE MORE E-COMMERCE RELATED BUSINESSES.”**

subsidized hands-on training to rural and micro-businesses.

### **Make Venture Capital More Readily Available**

A lack of venture capital was reported by the survey respondents as well as by the small businesses that participated in interviews. While there are some government funding initiatives in the state, such as the Ben Franklin Partnership, it is recommended that the state encourage public-private partnerships to develop more sources of venture capital to promote high-tech businesses in the commonwealth.

### **Foster the Right Image**

The attitudinal barrier prevented urban businesses in Australia from hiring skilled rural-based teleworkers, whom they considered “slow-talking, slow-thinking bushies.” There was a campaign to change the image. A similar campaign is essential for rural Pennsylvania—changing the image of “blue collar steel/coal mining workers” to “smart people living a smart life.” The image is critical in attracting and retaining technologically sophisticated employees in the state. To a certain extent, the “Pennsylvania: Stay Invent the Future” initiative is addressing the issue. However, a more aggressive campaign is needed.

### **Create a One-stop Shop**

It is recommended that Pennsylvania create a one-stop shop along the lines of the Nebraska Development Network (NDN) or Indiana County’s Center for Economic Operation (CEO) to get information to the businesses and individuals that don’t know how and where to get it. These efforts should be replicated throughout the commonwealth at the local level. It is important to not only create the suggested one-stop shop, but also to heavily advertise and promote it.

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**“TO PROMOTE E-COMMERCE, THE COMMONWEALTH SHOULD MAINTAIN THE STATUS QUO REGARDING TAXING E-COMMERCE. THE SURVEY RESPONDENTS CLEARLY INDICATED THAT IF AT ALL E-COMMERCE IS TAXED, THREE THINGS NEED TO HAPPEN: TAX RULES MUST BE SIMPLIFIED; TAX-COLLECTION SYSTEMS MUST BE SIMPLIFIED; AND MAIL AND TELEPHONE ORDERS MUST ALSO BE TAXED.”**

## **Maintain Status quo Regarding Taxing E-commerce**

To promote e-commerce, the commonwealth should maintain the status quo regarding taxing e-commerce. The survey respondents clearly indicated if e-commerce is taxed at all, three things need to happen: tax rules must be simplified; tax-collection systems must be simplified; and mail and telephone orders must also be taxed. These can only be done through the cooperation of federal and state governments in the country.

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## **Capitalize on High-tech Success Stories: The Public-Private Partnership**

The state should identify a short list of three or four success stories of e-commerce deployment that demonstrates how communities, private sector, government, and universities can collaborate to achieve success. Such success stories are needed to serve as role models that say to everyone, “Yes, it can be done here.” Make those businesses the flagship enterprises to attract other e-businesses.

## **Turn Cottage Industries into Small Businesses through E-commerce**

The commonwealth may help cottage industries to become small businesses through eTailing by, for example, supporting initiatives that assist with the startup of galleries and signing up craftspeople, artists, fine art faculty and students. Initiatives may also help to group market the eMall and for every order processed, a certain percentage of funds may be used to sustain the project.

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