

Lessons Learned from a Study of E-commerce Usage and Impact Among Small Businesses

Prashanth B. Nagendra¹⁾, Ramesh G. Soni²⁾

¹⁾ Indiana University of Pennsylvania, Department of Management (Nagendra@iup.edu)

²⁾ Indiana University of Pennsylvania, Department of Management (rgsoni@iup.edu)

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Abstract

Recent economic statistics and future projections by experts indicate that opportunities for economic growth in the future is going to come mainly from businesses of the “new economy” that utilize the powerful strategy of e-commerce. The rural parts of Pennsylvania, that had been a leader in the steel and coal industries of the 20th century, have been slow in adapting to e-commerce and attracting high-technology businesses. It is important to determine if the rural parts have the necessary ingredients to participate in the “new economy” and reap the economic benefits that certain other regions of the country and world are experiencing. Small businesses that dominate the economy in rural parts of the state (and account for half of the US GDP), need to be capable of engaging in e-commerce and be convinced about the business advantages of engaging in e-commerce. There are no specific studies that assess the awareness of e-commerce issues in the Commonwealth and develop strategies to enhance e-commerce activity. This study fills that void. The article outlines in detail the goals of an yearlong study, the methodologies used, the results, conclusions and general recommendations.

1. Introduction

Economy in Rural Pennsylvania is dominated by businesses that belong to the “old economy” industries such as coal and steel, and their small business ancillaries, which have experienced insignificant growth or decline in the recent past. On the other hand, it is the “new economy” industries that have a greater potential to help the overall country’s economy to grow. In order to experience significant economic expansions, rural parts of the Commonwealth need to rapidly adapt to the “new economy” by utilizing technology and e-commerce. However, this adaptation will not be smooth and far-reaching unless the small businesses--constituting about 90% of all businesses in rural Pennsylvania--participate actively in e-commerce. To do that, small businesses need to: (1) possess the necessary confidence in the safety and security of the Internet, (2) have the required electronic infrastructure, (3) experience tax benefits and government support while they make the transition, (4) have access to the human resources and any needed training, and (5) most importantly, have the perception and belief that e-commerce makes good business sense (i.e, it provides them cost savings and benefits of enhanced productivity, market share, profitability and customer satisfaction).

2. Related Research

Literature is replete with articles pertaining to advantages, success stories and drawbacks of e-commerce. However, almost all of these articles are *descriptive* in nature or they present basic statistical results. Also, most articles address either the technological aspect of e-commerce or issues pertaining to dot.com businesses. A brief literature review related to issues pertaining to e-commerce and small business is presented in the following paragraphs. However, a detailed bibliography is attached in the appendix.

In spite of the recent economic downturn, the US Census Bureau reports that “retail e-commerce (B2C e-commerce) sales in the US during the final three months of 2001 (Q4) came to over \$10 billion, slightly more than one percent of the country’s total retail sales of \$860 billion. The latest e-commerce figures from the US government 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 US were up only 5.3 percent from the same time in 2000, e-commerce sales saw a 13 percent increase” (Clark, 2002). In addition, the Forrester Research estimates the Business-to-Business (B2B) e-commerce revenue to increase from \$109 billion in 1999 to \$2.7 trillion in 2004 (forrester.com). For these to occur, the small businesses constituting about 50% of the nation’s economy, need to participate in e-commerce in a significant way. Long (1999) reports the findings from a 1999 Computer Reseller News survey that although 55% of the small businesses polled (mostly with 25 or fewer employees) were using the Internet for business, *e-commerce* still may be in “the feeling-out stage” for most of them. Wallace (2000) discusses the lack of diverse routes in rural areas of the country through separate switching links to AT&T, MCI, Cable & Wireless, etc. This lack of alternate switching links is a drawback for these rural businesses since their Web sites 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, San Francisco, etc. (Rosa, 2000).

Many countries in the world and the states in the U.S. are encouraging e-commerce activity by providing tax breaks. In addition, please observe the following examples of government assistance in developing e-commerce. Singapore is developing infrastructure, providing education, and creating an e-savvy culture (Prabhu, 1999). Canada is developing an 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, access to web-based information resources, etc.

In 1999, Ernst & Young's e-Commerce Coalition addressed two issues of greatest concern to business and government: (1) the impact of e-commerce on state and local government tax revenues, and (2) the challenge of reporting and collecting sales tax (especially by small businesses) in the online world (McIntosh, 2000). Proponents of e-commerce vehemently oppose taxing e-commerce as they claim it to be a major hurdle for small businesses in utilizing the Internet for their competitiveness. Since sales tax represents more than 25% of total state tax revenues across the US (Plotkin, 2000), critics of the Internet Tax Freedom Act have delineated negative effects of loss of sales tax revenues for the state governments such as cutting funding for state schools, hospitals, fire/police departments, etc. (e.g., Alster & Doler, 1999).

The benefits and challenges of e-commerce are discussed and debated at length in the literature. However, the reported *empirical research* in the area of Ecommerce is minimal while that pertaining to small businesses and e-commerce is infinitesimal. The Winter 2000 Newsletter of AACSB-I, the premier accrediting body of business schools, underscores the need for the type of research outlined in this current proposal—"...the best research that can be done with e-commerce now is fundamental research that has an applied emphasis." This e-commerce project had a strong applied research emphasis.

3. Goals and Objectives of the Study

3.1. To assess the level of e-commerce utilized by small businesses in rural PA

- To identify demographic characteristics of small businesses that are engaged in e-commerce
- To identify the level, type and extent of e-commerce activity by small businesses in different industries and different regions of the state

3.2. To understand the perception and readiness of entrepreneurs and small business owners pertaining to E-commerce

- To assess their confidence in a safe and secured Internet to conduct e-commerce
- To determine their perception of access and availability of infrastructure in the region to conduct e-commerce
- To determine their perception of the benefits of tax incentives and other government incentives to engage in e-commerce
- To determine their perception of the availability of affordable human resources and training required to engage in e-commerce
- To determine their perception of e-commerce as a tool that makes good business sense

3.3. To assess the infrastructure needs of Small Businesses

- To assess communication and Internet-related infrastructure in the region
- To assess government support and incentives for small businesses to conduct e-commerce
- To assess the access and availability of affordable human resources

3.3. To benchmark rural PA e-commerce activity and infrastructure with other "successful" regions in the country

3.5 To make policy recommendations to relevant government agencies and departments that can help enhance e-commerce activity in rural PA.

4. Synopsis of Research Methodology

1. *A comprehensive mail survey was conducted.* The survey was sent to a stratified sample of 5,000 small businesses. The stratification was done based on ten regions of the commonwealth and nine industry categories. The MarketPlace software was used to identify the total number of businesses in each region and industry category and subsequently, *proportionate* number of surveys in each region and each industry were sent out to randomly selected small businesses in PA. The survey was sent to 4,000 rural businesses and 1,000 urban businesses to study potential differences among rural and urban businesses. The respondents were given a username and password to exercise the option of filling out the survey on the Internet. A follow-up letter was sent after six weeks requesting participation in the survey again. The final response rate was 7.5%. The survey was finalized after pilot-testing it

with small business owners (both experts and novices in e-commerce), and experts in the fields of market research, e-commerce and small business management. The survey covered questions that would address most of the objectives under Goals 1 and 2 above.

2. *Interviews—telephone and personal*

- a. Small businesses—several small businesses that have been successful in deploying e-commerce were identified with the help of Small Business Development Centers (SBDCs) and local development districts (LDDs). Telephone or personal interviews were set up with twelve businesses and a set of questions that addressed goals 1, 2 and 3 were posed to the small business owners and/or top managers. The interviews lasted for one hour, on average. The questions were structured but the interview was left to be unstructured to ensure comprehensive feedback from the respondents.
- b. Telecommunications Businesses—senior managers from six small and large technology infrastructure businesses were interviewed in person, by phone or by e-mail. All of these businesses were first contacted by e-mail. At that time they were provided with a brief synopsis of the project and were presented with some open-ended questions geared toward understanding their service offerings to small businesses in Rural Pennsylvania. Subsequently, in-depth telephone or personal interviews were conducted to obtain answers to the question sent by e-mail. Two businesses preferred to provide some information by e-mail only as they could not schedule an acceptable teleconference time due to conflicting schedules or personnel unpredictability (the telecom businesses were experiencing the worst time in their history at that time—fallout after 9/11, bankruptcies, layoffs, etc.)

3. *Secondary research*

- a. Catalogs, brochures and web sites of SSHE system universities and Penn State to determine the courses, degrees, certificates, and continuing education programs pertaining to e-commerce.
- b. Journals, magazines, and web sites to conduct research pertaining to technical infrastructure, human resource infrastructure, benchmarking, etc.

4. *Focus group*—a policy-making focus group was conducted after primary and secondary research were completed. The participants included state legislators, representatives from Department of Community and Economic Development, county planning offices, e-commerce experts, business college Dean, small business owners, venture capital experts and technology experts. The focus group was conducted to: a) discuss the research findings pertaining to e-commerce deployment in rural Pennsylvania, b) have an interactive dialogue (on relevant e-commerce issues) among a diverse, knowledgeable and influential group of individuals and c) *Specifically and most importantly*, based on research results and focus group participants' input, 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.

5. Results

- 368 small businesses responded
- 280 rural and 63 urban businesses (25 did not report their location)
- 174 e-commerce and 194 non e-commerce businesses
- 11 out of the 174 e-commerce businesses were purely of the dot.com nature
- 59 of the 174 e-commerce businesses used third party web-hosting services

Type and Extent of E-commerce Activity

- Table 1 shows the extent of e-commerce activity of different types. Businesses are engaging in mainly the marketing aspects of e-commerce (advertising/selling/customer service) and in electronic data interchange and conducting research.

Reason for Deploying E-commerce and Resulting Benefits

- Data in Table 2 indicate that the top initial reasons to deploy e-commerce and the top benefits of deploying e-commerce are almost identical.
- Statistical analysis confirmed that businesses that had identified a specific initial reason for deploying e-commerce reaped greater *corresponding* benefits in that category.
- For example, 54 businesses had “improved flow of information” as an initial reason to deploy e-commerce and the corresponding average benefit reported in this category 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 only 1.95 on the scale of 1 to 4.

Table 1 Type and Extent of E-commerce Activity

Activity	None	Low	Med	High	Respondents
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/inventory	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

Table 2 Initial Reason for Deploying E-commerce and Benefits

Initial reason for deploying e-commerce /Benefits	# of businesses citing reason	% of businesses reporting Medium & High benefit
Flow of Information	54	79.4%
Organization Image	28	61.1%
Productivity	24	55.5%
Responsiveness to Customer Needs	14	52.7%
Quality of products/services	17	44.5%
Access to new markets	18	44.3%
Increased sales	25	43.4%

Reasons for Not Engaging in E-commerce This was the question answered by the 194 businesses that did not engage in ecommerce. Respondents were allowed to pick more than one reason. The top most reason for the businesses to not engage in e-commerce was that it was “strategically not important for their business.” The other major reasons were a) uncertainty of the Internet’s performance/reliability/security, b) lack of affordable technical infrastructure and c) lack of knowledgeable and skillful workforce. There was no major difference between rural and urban businesses on these reasons except for the top reasons—while 60% of urban businesses not engaging in e-commerce thought that it was not strategically important for their business, 70% of rural businesses believed in the same reason.

Table 3 Top Reasons for Survey Respondents to Not Engage in E-commerce

Strategically not important for business	138
Uncertainty of Internet s performance/reliability/security	49
Lack of affordable technical infrastructure	39
Lack of knowledgeable & skillful workforce	35
Hardware/software too expensive	25
Lack of venture capital	24
Unpredictable legal environment	23
Lack of conducive business climate	21
Concern that govt. will tax/overtax e-commerce	7

Internet Connection Needs

The respondents were asked to fill out their needs with respect to Internet connection starting from simple dial-up capability to T1/T3 lines. Table 4 shows the results. It was surprising that 58% of the respondents wanted a dial-up service. This is probably because a large majority of them use third party web hosting services and may not need broad-band 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, increasing set of weights were assigned to various connection types from dial-up to T1/T3. These weights were used on both the “really need” and “currently have” responses to check if the overall connection needs were met. Based on that,

- 45.4% of the businesses deploying e-commerce report that they do *not* have adequate Internet connection
- *Differences in perception* of businesses that have adequate Internet connection needs and those that do not have:
 - No difference in affordability of Internet connection
 - No difference in adequate availability, expandability & security
 - *Significant difference in adequate bandwidth*

The inadequacy of bandwidth was also brought up by small business owners during the interview process, which will be described in a subsequent section.

Table 4 Internet Connection Needs

	Dial-up	ISDN	DSL/ Cable	Satellite	T1/T3
Really need	58%	12%	20%	5%	14%
Currently have	10%	2%	26%	6%	15%

Numerous other results will be shared during the presentation.

6. Conclusions

The conclusions presented here are based on the survey, interviews of technology businesses, interviews of small businesses engaging in e-commerce in rural Pennsylvania, a literature review, and focus group discussion:

Perceptions and Readiness of Rural Entrepreneurs

- There is significantly more ecommerce activity in the urban counties as compared to the rural counties of the Commonwealth.
- There does not seem to be any particular region where ecommerce activity is significantly higher than other regions of the Commonwealth.
- E-commerce is more prevalent in the following industry sectors--manufacturing, service and Finance, Insurance and Real Estate (FIRE).
- The Agricultural sector is far behind other sectors in engaging in e-commerce.
- The majority of ecommerce activity is in the marketing aspects of e-commerce and electronic data interchange (EDI).

- Businesses are reaping *their expected* benefits from engaging in e-commerce. Improving flow of information, organization image and productivity were the three top reasons for businesses to engage in e-commerce and these were also the three top benefits that were reported.
- Surprisingly, increased sales and access to new markets were not the top reasons for businesses to engage in e-commerce.
- The top most reason for the businesses to not engage in e-commerce was that it was “strategically not important for their business.” Also, a significantly higher proportion of rural businesses as compared to urban businesses believed that e-commerce was strategically not important for their businesses. It is hoped that the businesses responding to this question selected this reason based on their careful analysis and not just on their gut feeling. 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 utilize 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 its business. Hence, it can be concluded that most businesses must perform a comprehensive strategic analysis to rule out, if at all, the strategic importance of e-commerce to their businesses. It is worthwhile to do a follow-up research to find out why the small businesses feel that engaging in e-commerce is not strategically important for their businesses. The other major reasons for not engaging in e-commerce were: a) uncertainty of the Internet’s performance/ reliability/ security, b) lack of affordable technical infrastructure and c) lack of knowledgeable and skillful workforce. All of these are important reasons that need to be addressed.
- It was obvious that businesses that were successful in e-commerce were caught in a paradoxical 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 a) bandwidth, b) alternate routing, c) venture capital, d) critical mass of business engaging in e-commerce that results in number of related drawbacks including flight of capital and employees from the region.
- Small businesses successful in e-commerce attribute their success to a) top management commitment and b) performing strategic analysis and cost/benefit analysis pertaining to e-commerce. The project directors got an impression during the small business interviews that the owners and managers of the successful businesses were highly motivated and enterprising individuals.

Highlights of Perceptions on Regional Issues

- The poor perception of the region’s image as a high-tech center was blamed to be one of the reasons for the lack of e-commerce activity in the state. It is important to promote the urban areas of Philadelphia, Pittsburgh, etc. as high-tech areas, which may provide residual positive impact on the nearby rural counties.
- The lack of venture capital is another perception that stood out and the main reason quoted by many small businesses for this was the poor perception of the region’s image. By addressing the image issue, it is possible to attract venture capital from bordering and nearby states of New Jersey, Maryland, and Virginia.
- Businesses, in general are confident about a safe, secured and reliable Internet for engaging in e-commerce. However, businesses are still wary of hacking/virus 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. *If* e-commerce is taxed, tax rules must be standardized and collection system must be simplified.
- The educational institutions (all levels) in the region are perceived to be adequate.
- The ability to recruit and retain employees and consultants in rural areas is a challenge. The two major reasons are again a) a perceived “poorer quality of life” and b) the lack of a critical mass of technology-oriented businesses.
- There is a general lack of awareness of e-commerce issues. It is important to raise this awareness in order for businesses and consumers to engage in e-commerce.

Technological Infrastructure

- Direct or leased lines by any of the telecommunication businesses can serve practically any point in Pennsylvania.
- The location and type of service dictate the cost. For remote areas cost becomes extremely prohibitive.
- Availability of fail over and redundancy in connectivity (that is alternate routing which is very critical for businesses) is lacking due to low demand volume.
- Some of the smaller connectivity providers are worried about monopoly that exists in most markets; hence the small businesses in rural areas are getting deprived of competitive prices.
- Most of the small businesses that were interviewed reported that they relied on 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 high-density of large Internet providers, who guarantee fail over and redundancy in connectivity to ensure 24/7 availability of companies’ websites.
- Although most businesses reported that they require only a dial-up connection to the Internet, 45.4% of the businesses reported that they do not have adequate Internet connection.

Educational Infrastructure

- Across the state, educational institutions—ranging from community colleges to world-renowned universities—are offering education in the area of e-commerce and relevant technologies.
- These educational offerings range from courses in e-commerce/technology to full-fledged graduate degrees in e-commerce.
- Most 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 is minimal and easily available. However, many interviewees hope that this is not going to be a “Catch-22” situation—non-availability of local talent due to the lack of critical mass of opportunity while the lack of critical mass of opportunity due to the lack of availability of local talent.
- A brief sample of educational offerings are presented in Table 12. The only thing lacking is short-term (1 day to a week) application-oriented workshops geared toward small business owners/managers.

Recommendations for rural Pennsylvania and similar regions will be discussed at length in the presentation.

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