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World Class Region Initiative: NortheastOhioEconomy.com

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NortheastOhioEconomy.com

How the Internet Can Help Northeast Ohio Businesses, Communities, Institutions, and Citizens Create a More Valuable Economy

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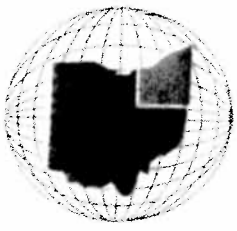

A project of the Northeast Ohio Research Consortium

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About the Author

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Don has assisted over 200 public and private sector clients with economic development, environmental, and business development projects in 36 states and 13 countries through his work at CSU. Clients include state and local governments; chambers of commerce; nonprofit development organizations; electric, gas, and telephone utility companies; banks; port authorities; real estate developers; federal government agencies; colleges and universities; national trade and professional associations; foreign government development agencies; and major international corporations.

Don is a former board member of the National Council for Urban Economic Development (CUED), the American Economic Development Council (AEDC), the MidAmerica Economic Development Council (MAEDC), and the Ohio Development Association (ODA). He currently is an advisor to USEPA's Environmental Financial Advisory Board. Don has published several academic and professional articles, book chapters, monographs, and reports on economic development, business, and environmental issues.

The Northeast Ohio Research Consortium provides research and analysis and facilitates regional networking among institutions and organizations. The Consortium's World Class Region Initiative explores the critical path to global economic competitiveness.

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Bill Ahrens, President of Netfarm Inc., a local Business-to-Business (B2B) electronic commerce company, deserves a medal for putting up with my many questions. My hope is that this monograph can help people to better understand what companies like his have to offer to the regional economy.

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The industry employment forecast data used in the study were prepared by Regional Financial Associates (West Chester, PA). Wes Basel was helpful in expediting our data request and advising us on formatting data for analysis.

Last, but certainly not least, I wish to thank Dr. Larry Ledebur (Urban Center Director), Dr. Ziona Austrian (Associate Director, Urban Center Economic Development Program), Dr. Ned Hill (Professor and Senior Research Scholar), and Susan Petrone (Urban Center Editor) for their very helpful editorial comments on this monograph. I knew that I could count on the economists in our midst to keep me from getting too carried away with my wild ideas.

Donald T. Iannone
Cleveland, Ohio

Personal Note

Henry David Thoreau said: "Go confidently in the direction of your dreams! Live the life you've imagined. As you simplify your life, the laws of the universe will be simpler." These words have been ringing in my ears for some time. After 14 very productive and enjoyable years, I recently made the decision to leave Cleveland State University in June 2000. It is my hope that *NortheastOhioEconomy.com* will provide a bridge of transition between my work at the university and my future work.

I started out with the intention of preparing a fairly traditional report on the Northeast Ohio economic region, but decided after looking at the preliminary forecast data that little new was to be learned from the exercise. In short, I concluded that the region has not grown appreciably in the last decade and that the outlook for the next decade is not much better. The 13-county region is expected to increase its total employment by only 0.8 percent annually and real value-added economic output is forecast to grow by 2.17 percent annually during the 2000-2010 period. By comparison, the nation will see employment growth at twice the Northeast Ohio rate and national economic output is expected to grow 2.71 percent annually during the 2000-2010 period.[1]

The region's economic leaders and citizens have been listening to this slow growth message far too long. Why depress them even more? I concluded that the focus of this monograph should take a U-turn and head in the direction of those factors that will drive business and economic growth in the future. The Internet industry, a rapidly growing component of the larger Information Technology (IT) sector, was the logical focus.

Earlier information technologies have contributed to Northeast Ohio's past value-added economic output growth. Greater application of these technologies within the region in the future could potentially help the region catch up with the nation's economic output growth. This monograph is bold, and it reaches in places beyond where the available data can support, but it is the right issue for our economic leaders and citizens to consider if they want to create a more valuable economy for themselves in the future.

Why start a research monograph on the Internet industry sector with such a personal introduction? There are three reasons. First, the ideas contained in this monograph are indeed personal, like most ideas communicated by others on paper or through conversation. Second, readers are often left to wonder where the ideas contained in books, articles, and reports actually come from. Simply reading the footnotes, endnotes, and references is not enough. Finally, the Northeast Ohio economy needs some bold new ideas to guide, shape, and give meaning to its future development. Northeast Ohio residents and businesses will need to be much more adventurous with their ideas in the future if they are to survive and thrive in the Digital Age.

Executive Summary

This monograph identifies how Northeast Ohio businesses, communities, institutions, and citizens can use the Internet to create a more valuable regional economy in the future. The Internet is changing how companies, government agencies, public and private institutions, and individual citizens are doing business. Because of these changes, economic development opportunities and strategies are also undergoing major changes. Northeast Ohio must be ready for this brave new world of electronic business and Internet commerce. While we are taking some steps in this direction, we have a long way to go to fully tap the potential of the Internet economy. *NortheastOhioEconomy.com* identifies how the region can speed its progress along this new development path.

This monograph sees the Internet as a valuable, and currently under-utilized, tool that can promote greater technology-based economic development within the region. It does not see the Internet as a panacea for our complex economic challenges. There are no "silver bullets" or quick fixes for the problems of regional economic transition. Economic development is already over-burdened by too many fads and fancies. *NortheastOhioEconomy.com* seeks to provide a thoughtful and creative approach to how the region's economy can grow stronger in the face of changing technologies and new global market realities.

Northeast Ohio and Ohio are currently rated as average in their residential and business use of the Internet, according to the preliminary results of statewide surveys conducted for the ECom-Ohio Project.[2] For a state that ranks 7th nationally in population size, total employment, and gross state product, is an "average" rating good enough when it comes to Internet usage? Given the growing importance of the Internet in business and economic affairs, the simple answer is that these ratings are not sufficient. Being average is not good enough for Northeast Ohio either. How can we do better? This monograph identifies how Northeast Ohio can gain a larger share of the Internet economy marketplace in the future.

What changes are ahead for Northeast Ohio in this new age of Internet-enabled economic development? There are eight trends to watch:

- **More residents online**
- **More work from home through telecommuting**
- **More business on the Net**
- **Old and new industries unite on the Net**
- **More online government services**
- **More Internet-enabled education**
- **More institutional business online**
- **Economic development goes digital**

Which Internet-based economic development strategies will best prepare Northeast Ohio to compete in the new Information Age economy? This monograph identifies several strategic actions that regional economic leaders should consider for the future. Five central priorities must be addressed:

- **New Business and Industry Opportunity Targets**
- **Online Business Purchasing and**
- **Marketing**
- **New Business Location Strategies**
- **New Economic Development Strategies**
- **Improved Information and Communications Infrastructure**

Future Internet Economy Development Targets

Two categories of industries and businesses should be viewed as priority development targets in Northeast Ohio in the future:

1. **Internet industry sector businesses**, which fall into four strategic business groups, according to the Electronic Commerce Research Center at The University of Texas at Austin:

a. Infrastructure layer firms: businesses that provide basic telecommunications and Internet access services.

b. Applications layer firms: businesses that provide software and a variety of services connecting intermediary and commerce level operations to the Internet infrastructure.

c. Intermediary layer firms: businesses that serve as portals, gateways, and hubs for e-commerce businesses.

d. Commerce layer firms: businesses that are supporting, facilitating, and conducting Web-based business transactions. While business-to-consumer (B2C) commerce has received the most public attention, the business-to-business (B2B) commerce marketplace is much larger and growing more rapidly than the better-known B2C market.

2. **Information and knowledge-intensive industries** that depend heavily upon the Internet to meet their information and knowledge needs. Key industry and business targets include:

- **Finance, insurance, and real estate (FIRE).**
- **Advanced business services** (accounting, law, management consulting).
- **Engineering and design services** (electrical, electronic, computer, chemical, mechanical, civil, environmental, manufacturng, industrial, architectural design).
- **Computer programming, software, and information management services.**
- **Back-office, order fulfillment, telemarketing centers.**
- **Corporate headquarters and corporate office facilities.**
- **Distribution and logistics sector.**
- **Travel and tourism sector.**

Online Business Purchasing and Marketing Priorities

Many regional businesses will need assistance in developing new opportunities offered by the Internet economy and in overcoming or avoiding possible threats introduced by online business strategies. These include:

- **Smaller Company Assistance**
- **Global Market Knowledge**
- **E-Business Solutions for Vertical Industries**
- **E-Cluster Hubs**

Online Workforce Hub

Regional officials should examine the merits of creating a new Internet-based workforce information and service center called the Net-Work Hub. The Center should be organized with three components:

1. **Industry Cluster Work Innovation Centers** to provide labor market information services and promote workplace innovations by employers within the identified industry clusters.
2. **Flex-Work Center** to promote the exchange of information among Northeast Ohio employers and workers interested in contract, contingent, and temporary employment assignments.

3. **Talent Marketing Center** to work with private employment agencies, executive and technical recruiting firms, private employers, and other groups to attract more highly skilled and technically trained people to live and work in the Northeast Ohio region.

Internet-Enabled Business Location Strategies

Northeast Ohio's leading economic development organizations should assess the benefits of these Internet-based strategies to compete in the future business location marketplace:

1. **E-Business Success Database:** Assist Northeast Ohio companies in creating an "E-Business Strategy Center" that provides information about the region's manufacturing and service sectors' success in using e-business strategies related to marketing, procurement, business facility location, R&D management, and workforce development.

2. **Regional Marketing Site:** Create a single integrated regional economic development marketing website that communicates the region's overall advantages for business investment and growth.

3. **Regional Economic Development Database:** Create an online database that can be shared and used by regional and local economic development organizations in preparing customized business location and investment proposals.

Economic Development Research Strategies

The Web is changing how geographic places provide economic development services on all levels. Northeast Ohio will need greater "knowledge" advantages to compete in the fast changing global marketplace. Economic development officials should assess the benefit of two research strategies in contributing to future regional economic development success:

1. **Online Economic & Fiscal Impact Analysis:** Develop online analytic models that provide economic and fiscal impact analysis and project financial analysis to public and private sector economic development organizations.

2. **Regional Business Database:** Create an electronic regional business database to support economic development, business, and market research projects undertaken by area economic development organizations, governmental entities, and private companies.

Regional Internet Infrastructure Development

Infrastructure improvements will be needed to support future Internet business growth in Northeast Ohio. Hopefully, competition among private telecommunications and Internet access providers will grow, resulting in lower prices and expanded product and service choice for regional businesses and residential consumers.

1. Market-Based Internet Infrastructure Solutions: Area economic leaders should seek proposals from major regional, national, and international companies on how they can help the region meet its future Internet infrastructure needs.

2. Coordinated Public Sector Internet Agenda: Public sector investments in the region's Internet infrastructure should be coordinated across political jurisdictions to ensure that they offer an integrated network across the region supporting Internet business activities.

Regional Market Power-Building Strategies

Economic development organizations should help geographic areas to use their "market power" to retain, develop, and attract new economic opportunities. Internet strategies can help increase the region's future market strength. Market action strategies should be investigated to help respond to these foureconomic development challenges:

- **Better Internet Infrastructure Services**
- **Increased Information Industry Growth**
- **Entrepreneurship and Self-Employment:**
- **Flexible, Portable, and Customized Education**

The Northeast Ohio region must give greater attention to the quality and competitiveness of its emerging Internet industry sector. This sector will play a major role in determining the future competitiveness of local residents, industries, and communities in the new Information Age. The Internet will in part decide the fate of many of Northeast Ohio's existing industries, and it will be a deciding factor on whether new industries locate and develop here.

Introduction

Northeast Ohio needs to adopt a bolder set of ideas about how to make the region's economic base more "valuable" in the future. Where do bold new ideas come from? Ralph Waldo Emerson's words can help us answer this important question: "What lies behind us and what lies before us are tiny matters, compared to what lies within us." In this light, hopefully this monograph's ideas will touch Northeast Ohio residents, ignite their personal creativity, and give them the courage to build their futures around exciting new ideas for their career callings and work. Emerson's observation is worth recalling as readers toy with these ideas about the Internet industry.

NortheastOhioEconomy.com paints a picture of where we might be headed over the next ten years as we wrestle with and embrace the Internet as our next technological platform to understand and transform our world. The "dot.com" phenomenon is just one leg of a much longer race in this author's opinion, despite protests by eager Internet entrepreneurs that this may be a much longer resting place in our economic evolution. Other economic stages lie beyond dot.com. The Quaternary Sector, as the Japanese futurist Yoneji Masuda describes, is on the horizon.[3]

The Internet is just one component of this massive shift toward "information and knowledge-dominated" industries. Individuals who believe that the Internet is a fad that will pass shortly,may be in store for a rude awakening. Internet technologies and commerce will produce permanent structural changes in industries comprising our economy, and a very large number of companies, industries, institutions, workers, and political jurisdictions will not be able to react quickly enough, and as a result they could become historical artifacts. This is not an economic storm that businesses and people can simply wait out. Northeast Ohio must avoid becoming an artifact.

Readers seeking hard and fast answers to how new information technology will change regional economies may be frustrated by my answer, which is that these technologies will not only continue to evolve, but they will change even more rapidly in the future. My best guess is that the Web will advance us toward the "connected and wired world" that many people have been talking about for sometime. The Internet is fundamentally about "connectivity through network and community-building." In accomplishing this purpose, it is removing some of the communication and information walls that have separated people, activities, businesses, institutions, and other components of our lifves.

Fritjof Capra, the theoretical physicist, believes that the Internet and other new technologies are helping us to discover and navigate within the larger "web of life."[4] Capra points to the "network" as the basic pattern of organization found in all living systems. The Internet, in this light, is just another representation of this pattern of organization that governs our lives.

This is a good time for some perspective. Twenty years ago, Yoneji Masuda, wrote *The Information Society as Post-Industrial Society*, which defined a captivating vision of how industries based on information, knowledge, arts, and ethics will ascend as a part of what he terms the "Quaternary Industry Sector."[5] The quaternary sector refers to those industries that revolve around the creation and processing of information. His insights provide a valuable context for this monograph's ideas.

Masuda identifies four related quaternary sector industry groups or clusters:

1. Information industries: information professionals; printing and publishing; computer and data processing; news and advertising; information machinery and equipment.

2. Knowledge industries: consultants; designers; think tanks; research institutes; engineering; education; libraries; equipment used in knowledge production and transfer.

3. Arts industries: writers; composers; singers; producers; theater companies; movie production; recording studios; photographic equipment; musical instruments; multi-media technology; television and radio equipment.

4. Ethics industries: religious leaders; churches; temples; spiritual training centers; yoga and zen centers; bioethics; and psychological training and therapy centers.

The value of Masuda's taxonomy is its inclusion of a wide spectrum of industries that currently finds itself very closely attached to the Internet industry sector. Masuda also captured the long-term development path of our world economy, showing us how new industries will push us into the next economic age. We need a longer-term economic and technological vision to help guide our thinking and planning.

Masuda views the quaternary sector as one of four major divisions of the economy:

1. **Primary industries:**
    a. Agriculture
    b. Fishing and hunting
    c. Mining and materials extraction

2. **Secondary industries:**
    a. Light manufacturing industries
    b. Heavy manufacturing industries
    c. Construction industries

3. **Tertiary industries:**
    a. Utility services
    b. Freight industries
    c. Communications
    d. Warehousing
    e. Finance and insurance
    f. Personal services

4. **Quaternary industries:**
    a. Information industries
    b. Knowledge industries
    c. Arts industries
    d. Ethics industries

Northeast Ohio must develop its quaternary sector industries using the Internet as a technological foundation in the future. While the four industry tiers (primary, secondary, tertiary, and quaternary) will continue to co-exist for some time, the greatest growth potential rests with the quaternary sector. Our regional economic leaders should work to advance this growing sector.

"Net Value" Economic Results For Northeast Ohio

This region should be using the Internet to foster "Net-created economic value" Northeast Ohio communities, industries, institutions, and residents. "Net value" means new economic value created for industries, communities, and people through the strategic use of the Internet and other information technology.

The Internet industry sector is a new, rapidly growing and integral component of the new technology-driven global economy that has been working itself into place over the past three decades or more. The Internet industry sector is a network of computer, information, and communications-related industries that derive their economic value by using computer-based technologies and the Internet as a platform and marketplace for various information, goods, and service products. As the global economy grows, the Internet sector will become ubiquitous in existing and emerging industries.

The Internet industry sector, like all emerging economic sectors, grows and develops by creating and adding new value to the economy. All organizations exist to create and provide new value to their customers, clients, funding sources, and other stakeholders. In any industry, organizations provide value to those they serve by structuring value chains, which I will define momentarily.

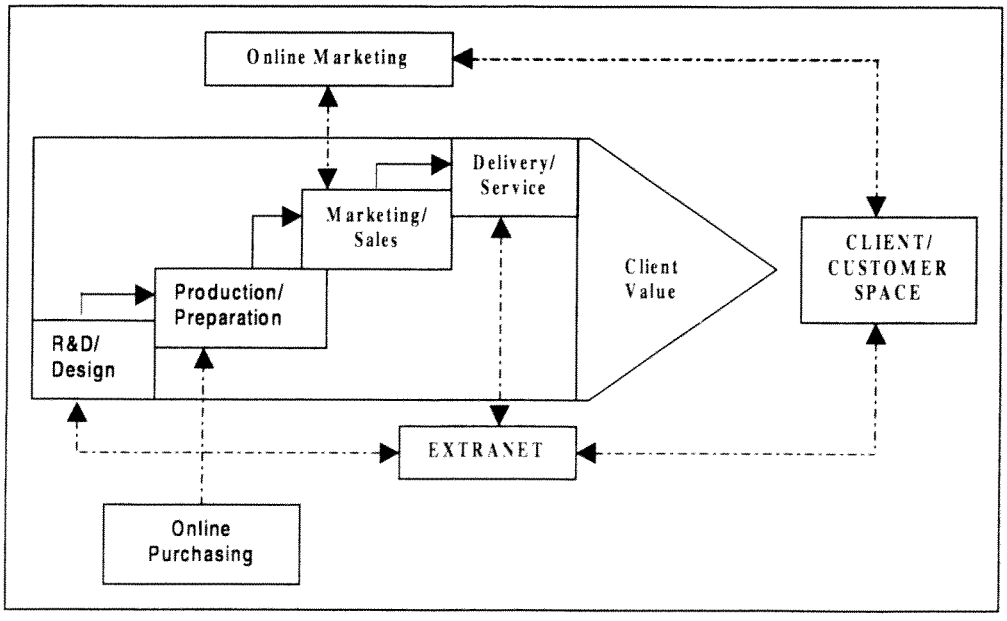
Organizations that fail to create sufficient value for their stakeholders will be eventually replaced by others demonstrating they can do the job better. This, in short, is the meaning of the term value migration, which is the flow of economic and stakeholder value away from "obsolete" business models to new, more effective ones. This can happen to any organization, including banking institutions, steel producers, public school systems, state universities, ballet companies, Internet startups, professional baseball teams, and even city halls.

A value chain is an integrated series of activities performed by an organization to create and provide new value for its major constituencies. Internet-based technologies and e-business strategies are the leading approaches used today by many types of organizations to produce radical changes in how organizations structure (restructure) their value chains. *NortheastOhioEconomy.com* discusses how the Internet could alter the value chain of most Northeast Ohio industries in the future.

Figure 1 illustrates how Internet strategies and technologies can promote greater organizational value creation.

A variety of online information exchanges, communications, interactions, and transactions now support the entire process by which an organization produces and provides value for its customers or clients. Online auctions are used to purchase inputs for the production or preparation process. These activities can produce significant cost savings on commodity products and services utilized. Online marketing is used to locate new customers and provide valuable product and service information to existing clients/customers. Intranets are used to provide common databases and information systems to help the organization achieve more effective integration of all value chain activities. Extranets are used to provide 24-hour-a-day, 7-day-a-week customer support. Internet-based activities enhance the value chain and increase customer value.

Figure 1: Model for Internet-Based Value Chain Enhancement



K-12 Education System Linkages As A Value-Chain Example

An example will create a better understanding of where this monograph is headed. The Internet industry's rapid and widespread growth is driven by its ability to increase value creation for business, governmental, institutional, and household users. Internet-based technologies and strategies are creating this new value by restructuring the value chains of organizations.

Because of education's crucial role in workforce preparation and economic development, we will examine it as a case study. E-business has much to offer the educational sector by helping schools, colleges, and universities to better serve their students and other stakeholders seeking value from these institutions. Let me say at the onset that our current educational crisis is a very complex issue, and while Internet solutions can provide some valuable help, the Internet is no panacea for these problems.

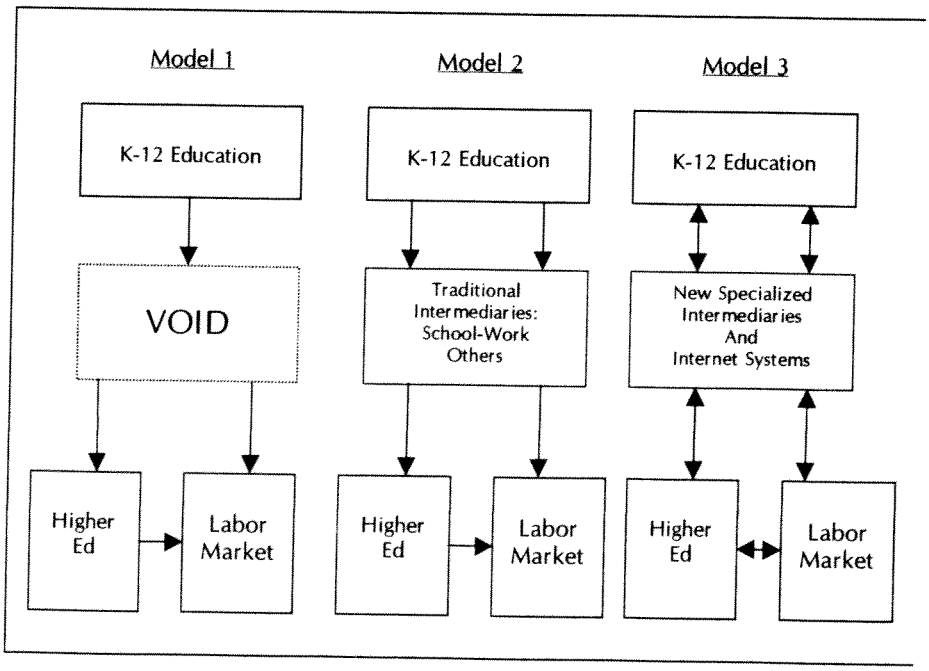
Several central city and suburban communities in Northeast Ohio face enormous challenges in resurrecting their troubled K-12 public school systems. This problem can be seen as a "value chain re-engineering" problem, and one that could be helped by Internet-based solutions.

Our education situation is an illustration of reduced client/customer value creation. While many politicians and school officials cite under-funding as the chief cause of institutional decline, a deeper look at the full value chain, and not just the funding stream, of these institutions may produce a better understanding of which future public policy and investment strategies will produce better results. Figure 2 (below) identifies three value chain models for linking K-12 education systems to higher education and labor market systems. These are simplified models for illustration purposes only.

The boundaries separating K-12 education, higher education, and the labor market are blurring in society. Old boundary lines are disappearing as new ones are being drawn. Hopefully over time, education and the labor market will become more closely integrated. To become more successful in the future, education must embed itself within all industries of the economy. Progressive communities and regions that see education as an evolving, flexibly packaged, life-long learning process will be most successful in keeping attuned to their resident and worker needs. Those places that fight this flow could be toppled by the more flexible, agile, responsive, and greater value-creating education systems.

Judging these ideas from earlier definitions and rules will fail to understand these new trends. Internet critics claim that computers and electronic systems will replace human experience, and that people and places, as we know them, will lose meaning and value. This is a very narrow and inaccurate way to look at the Internet's significance. It is true that the Internet will change how we relate, but properly used, this technology can strengthen our human bonds and connections. The Internet will not put an end to place, but rather it will expand the range of geographic options open to people and organizations.

Figure 2: Alternative Value Chain Models for Connecting K-12 Education to Higher Education and the Labor Market



The focus in each model in Figure 2 is on how the K-12 education system serves its clients/customers (students) by providing value chain linkages. In theory, K-12 educational curricula and the teaching/learning pro-

cess provide the knowledge and skills needed by students for successful college and/or the labor market entrance and performance.

Many employers argue that K-12 systems have failed in many cities and states to meet these later performance requirements, which can be viewed as a low value creation problem. The K-12 educational experience is organized around a concept of how knowledge acquisition and skill development should occur. The three models in Figure 2 illustrate how "intermediating" services add connectivity value to the education process. Intermediaries can be based within the K-12 education system (e.g., high school guidance counselors) or outside the system (e.g., School-to-Work, Cooperative Education). Most communities have a mix of both.

In Model 1, the value chains of K-12 education, higher education, and labor markets are separate and unconnected. Model 1 is an ineffective model because of its nonexistent connection between the K-12 educational system and downstream higher education or labor market systems. Schools that follow Model 1 do a great disservice to their students. Students leaving this type of school system are not prepared for an effective transition to college or labor market entry. The void that exists between the K-12 system and downstream systems reduces the value of the education that students receive in the K-12 system.

Model 2 provides intermediary services that aid the student in preparing for college or the workplace. This makes Model 2 a better value chain model than Model 1 because it provides some value-added links between the K-12 education system and higher education and the labor market. Students are better served in Model 2 systems because of the role of intermediaries, like School to Work, that help students make more successful connections to higher education and/or the labor market. A shortcoming of Model 2 is that the value chain linkages are only one-directional and rely on traditional workforce programs that are often not well integrated with either educational systems or employer work systems.

Model 3 is the best of the three models because it establishes "information-rich," two-way value chain linkages connecting the components of the entire education-labor market system. These linkages increase the value created at all levels (K-12, higher education, and labor market). The student benefits by being able to anticipate and plan how he/she will use earlier knowledge or skill learning in later steps. This reduces the uncertainty associated with preparation for the next step. This model uses new intermediaries that have specialized education and labor market knowledge, as well as Internet-based information and communication channels that help facilitate educational and career decision-making.

Most community school systems are currently utilizing some version of Model 2, which still has some significant deficiencies in performance. A future move to Model 3 value chain strategies would greatly enhance the educational value created by area school systems. A number of school systems are beginning to make greater use of the Internet within the educational process. The State of Ohio Department of Education provides educational technology grants to local schools to promote these activities within the classroom. Internet websites providing online information and help to Ohio students and job seekers are growing.

The education value chain case study points to the need for better strategies that connect education, workforce development, and economic development by strengthening their value chain linkages. Northeast Ohio's future economic strategy should incorporate Internet strategies that foster new linkages among the region's major economic and educational resources. These Internet strategies could, for example, create specialized information resources and interactive online communities to help the region's major industry clusters develop the human resources required for their future growth and development within the region.

The value chain approach capitalizes on the interdependence of the region's educational sector, major industry employers, and other resources that help stimulate job and wealth creation. In the absence of these linkages, we could see further erosion of the region's major wealth-creating industries, and the subsequent erosion of the area's cultural and institutional resources that depend upon these major industries for funding and other forms of support. In summary, as the region's core economic sectors go, so goes the region's amenities and quality of life resources. Through new collaborative value-creation strategies, the region's major industries, educational institutions, and cultural organizations can work together to contribute more to each other's future growth and prosperity.

Using The Internet To Increase Regional Competitiveness

How will the changes brought about by the Internet affect our regional economic competitiveness, and how should we cope with the uncertainties caused by these whirlwind changes? Will these new technologies and strategies produce more help or harm to current economic interests within the region? How can Internet technologies be used to improve the performance of the regional economy by increasing the competitiveness of its driving industry sectors and clusters?

The Internet world is a highly competitive, "dog-eat-dog," frenzied world of fierce competition. Presently, it is the "fair-haired boy" on Wall Street. It is a world of new fast growth startups and initial public offerings (IPOs) that by most time-honored business standards are grossly overvalued by the stock market. [6]

Our relatively conservative Midwestern values may lead many Northeast Ohio residents to say: "Let's keep this Internet craziness on the West Coast, and continue to focus our attention on familiar 'bread and butter' manufacturing and service industries." Truthfully, this is not an option for Northeast Ohio businesses and workers. We must learn to survive, and hopefully thrive, in this brave new world because it is the next industrial revolution that will drive future business and area economic development models. This is fair warning to Northeast Ohio's long-established industrial giants, its struggling downtown retailers, its inner and outer-ring suburbs, colleges and universities, chambers of commerce, and many other organizational entities that have long wrested life from the region's traditional manufacturing sector. We must find a way to make the Internet Economy "click" for us.

The architects of Northeast Ohio's future economic development strategy must focus first on reinventing the region's economic value chain through new information technology solutions. Many of our earlier economic development strategies have avoided innovation-based value chain solutions and instead have sought "band aid fixes" for our earlier manufacturing job hemorrhage. The Internet industry sector can offer us more powerful strategies to transform the regional economy in future growth directions, if we use them in the right way.

Accelerated cost cutting will be a major goal of Internet business strategies over the next two to three years, which is well illustrated by the Big Three automakers recent announcement that they will create and utilize a giant eBay type online auction website to purchase auto supplies.[7] The ripple effects of these new Internet business strategies could be even greater in terms of auto-related job and business losses than those triggered by earlier centralized purchasing and global sourcing strategies instituted during the 1980s. State and local economic development organizations have had ample public sector incentives to buy-down the costs of goods and service production in the region, and the auto industry has been a major beneficiary of these programs in Ohio and many other states.[8]

Our favored strategy across Ohio in the past two decades has been to subsidize and offset high production costs through costly economic development incentives. Some state and local economic development officials will argue that we need to respond to these technological and economic impacts on traditional industries with even larger and deeper public subsidies. In other words, we should protect traditional industries by "buying them more time." While this response may appear to ease the pain of change in the short term, it will do little to make these industries more competitive in the future.

This approach is discouraged for two reasons. First, no amount of public money will prevent new Internet technologies from having their day in the sun. Second, a more appropriate and effective strategic response is to "get with the new technology" and make it work for communities and existing industry, and not simply bury our heads in the sand. The most effective incentives in the Internet Economic Age will focus on strengthening the value chain of businesses, geographic areas, and human beings as workers and entrepreneurs. This should be the focus of our future economic development strategic planning efforts.

Historically, regional businesses have worried about two interrelated issues: cost reduction and productivity growth. Better technology and more skilled workers have been the answers to these issues in the past. These will continue to be important solutions in the future. The Northeast Ohio economy has made progress in becoming more productive. The adoption and use of new information technologies have helped to speed this progress, but that alone will not secure our role in the future economy.[9] Costs and productivity will remain important issues for regional manufacturing and service industries in the future, but they must be addressed as components of the larger value chain reengineering process.

A growing number of economic regions have begun experiments to stimulate economic development through industry cluster growth.[10] Northeast Ohio economic leaders' recent attention to industry cluster-based economic development strategies can be seen as an application of the value chain-based economic development concept.[11] These strategies are valuable to the extent that they add to regional industry and firm competitiveness by strengthening business collaboration and linkages among geographically clustered firms belonging to a common industry cluster. If successful, these linkages can greatly enhance the inter-firm value creation that occurs in Northeast Ohio.

Surprisingly, there is no discussion in these recent Northeast Ohio industry cluster studies of how new Internet technologies and electronic business strategies could produce fundamental changes in economic value chains of the region's driving industries. Ziona Austrian, in her recent article on industry cluster case studies, does, however, discuss the importance of Northeast Ohio's software business cluster as a source of future economic growth for the region.[12] Regional software companies can help older manufacturing and service clusters increase competitive advantage through Internet business strategies. It is important also to recognize that in many cases these Internet solutions can and are being developed internally by firms. At a minimum, our regional economic strategists should add the Internet as an infrastructure resource supporting the growth of each of Northeast Ohio's driving industry clusters. A bolder approach would be to help firms within each target industry cluster to design and implement appropriate e-business strategies to enhance their regional business competitiveness.

The Internet can help us discover new value chain solutions for the regional economy, businesses, and peoples' professional and vocational careers. The author Marcel Proust said: "the real art of discovery consists not in finding new lands but in seeing with new eyes." The Internet can help Northeast Ohio economic leaders and citizens see their economic world with new eyes. The region's existing economic base is actually quite rich and diverse once you look beneath the surface.

The Internet is much more than a simple pipeline for information and communications. A great deal of value-added occurs on and through the Internet, which explains why nearly all business schools have introduced concentrations and degree programs in electronic commerce and business.[13]

In one "click," millions of dollars in new income can be made, and in another "click" it can be lost in Internet commerce. Consider the power of online industrial auctions performed by Internet superstars like VerticalNet (www.verticalnet.com) and FreeMarkets Online (www.freemarkets.com), which have the ability to save their clients 25-35 percent on the prices of industrial commodities and raw materials with just the click of a computer mouse. Does this approach to industrial buying alter the value chain of Northeast Ohio companies supplying manufactured products and raw materials to the national and global markets? Yes. As we couple the power of the Internet with the new market rules created by the deregulation of the telecommunications, electric power, banking and finance, and other industries, we can quickly see how sourcing of information and communications services, energy, and financial capital in various forms will move from local to national and global markets.

The upside impact of these changes is that businesses and households in Northeast Ohio soon will be able to acquire these services at much more competitive prices. The downside impact is that the region's current business strength in some of these industries may be severely eroded unless local companies adopt new customer-led, technology-based, global market-oriented business strategies.

Peter Drucker equated the impact of the Internet and e-commerce to the earlier impact of the steam engine and railroads on society. We knew we had the steam engine, but we had no idea that the railroads would develop as an application of steam engine technology. He says the same about the Internet and our failure to forecast the rise of electronic commerce. Drucker goes on to say: "In the new mental geography created by the railroad, humanity mastered distance. In the mental geography of e-commerce, distance has been eliminated. There is only one economy and only one market. The competition is not local anymore—it knows no boundaries.[14]

Where does this leave our current economic development paradigm that clings at almost any cost to state and local geo-political boundaries and local taxing jurisdictions? If Drucker is right, and I believe he is close in his assessment, then we are in for some major changes in how economic development will be practiced and approached in the next decade.

Who Needs Help?

Clearly, many regional businesses, institutions, government agencies, and individuals already see the Internet as a valuable resource to help them better perform their jobs now and in the future. A number also see it as a grave threat to their fragile "matter-based" existence. These "tech-scared" companies and institutions will likely wait too long to react to new, more efficient ways to do business with their customers and suppliers. The answer is simple. If you want to survive, use the Web as a strategy to better serve existing customer and to attract new ones. If you don't, your customers will leave you for another supplier that can bring them lower costs, greater convenience, and more service options.

Many Northeast Ohio organizations and residents are making significant investments in new computer and Internet capabilities to realize appropriate future business and economic opportunities.[15] The results of this research suggest that they will need to make even greater investment in these capabilities in the next decade. These systems will become more commonplace across the region in the next couple years. Greater skill and proficiency in using these systems will come with experience.

Obsolescence costs are potentially very high for all concerned about staying even with the accelerating Internet technology sector. It pays to follow a personal or business investment strategy that looks far beyond the next software upgrade. This is where Peter Drucker's longer-term perspective comes in handy.

Most businesses and many private individuals will use the private marketplace to reach most of their future Internet business goals. For this group, the biggest form of help is to provide the competitively priced, easily accessible, efficient, and flexible advanced telecommunications and information infrastructure that they will need, and then simply get out of their way and let them execute their investment and operating plans and strategies. The public sector will need greater assistance, especially in avoiding the mistake of creating redundant capacity within Northeast Ohio communities and counties, and in coordinating its investments with those made by the private sector.

Private individuals will need greater education about the residential technology options and choices available to them and how to make informed decisions for the long run. Right now the market is flooded with local and national companies offering home-based Internet access and web hosting services, cable television, ISDN, DSL, T-1, F/O cable, and other types of telecommunication connections to the Internet.[16] All of these service providers promise to solve the most problems for the customer. Few have the ability to guarantee their customers that the products and services they buy today will have any value tomorrow. Part of this problem is unavoidable because no one really knows what will happen in the next three to five years in the Internet race. The other part of the problem can be avoided by clearly defining which outcomes and benefits are expected from future Internet technologies. The smart companies will be in the driver's seat. This same principle should be applied to people and their personal investments in home-based Internet capabilities.

One important question for homeowners is: "How will all this newly purchased equipment, software, and other technological devices integrate to create the 'smart' house in the future?" This integration task could be extremely difficult and expensive for area residents if they do not have the right guiding plan. Right now, many Internet technology firms simply want to sell customers the latest software or equipment. Others are more concerned about educating their customers about what lies ahead.

People are also struggling to sort out the value of the growing number of academic courses, professional certifications, continuing education courses, private training seminars by computer equipment and software companies, Internet-based courses, community adult education and vocational training programs, and various other programs designed to increase people's knowledge and skill to work in technical computer and Internet-related jobs, or to work as non-technicians in highly information-intensive environments that are beginning to crash under the weight of continuous data and information flows. The research for this monograph suggests that everyone, regardless of his/her job description, will be more actively involved in information management and use in the future.

Most parts of the economy are or will be touched by the Internet. Wherever computers, databases, management information systems, communication systems, and knowledge centers currently exist, the Internet will provide a role in storing, distributing, networking, and adding value to these systems in the future. This means that the number and variety of Internet websites, Intranets, Extranets, and other networked systems will grow like wild fire in the next decade.[17]

This growth will not be unbridled however. Concerns related to data security, technical compatibility, personal privacy and confidentiality, upfront and ongoing operating and maintenance costs, future taxation policies, system and information ownership and control, intellectual property concerns, and general infrastructure capacity and availability will likely temper this growth in many industries, markets, and geographic areas. Some of these barriers are quite legitimate in that they give us time to think about what we are about to do. Others are quite unnecessary, and we should do our best to avoid them in the future.

It is also important to bear in mind that the pace and direction of Internet economic growth will vary across US regions and states. Differences in economic base, infrastructure capabilities, technology experience, personal values, market conditions, and many other factors account for these variations. Some states, like California, have been thinking and strategizing about Internet industry sector issues for some time. Other states, including Ohio, are just beginning to grapple with these issues. While Ohio has some unique and valuable academic and business Internet resources, the state is only about average in its level of effort and progress in advancing its infrastructure and commercialization of Internet space.[18]

Not all parts of Ohio are equally equipped to exploit the commercial advantages of the Internet.[19] For infrastructure reasons, many rural areas will lag behind newer urban and suburban areas in mounting effective Internet-based economic development strategies. Many older distressed inner cities will potentially miss out on some of the major economic benefits created by the Internet industry sector if they do not overcome current income and educational deficiencies. These problems are a part of what has popularly been termed the "Digital Divide," where the poor and undereducated become "information have-nots" in the new information society.[20]

Like many other states, Ohio is a patchwork quilt of telecommunication service areas. This arrangement is the result of the converging effects of short-term commercial decisions by telecommunications providers, state and local government policies favoring incremental solutions, and finally the nature of private and public demand itself for telecommunication services. This patchwork telecommunications system could complicate the task of connecting various urban and rural places across the state. Is this problem unique to Ohio? Research for this monograph indicates that a large number of other states face similar challenges.[21]

The federal government and higher education have played major strategic roles in creating the technological infrastructure and human resources that support the current Internet. After all, the Internet grew out of earlier research and development work by the United States Department of Defense. These entities will need to continue to play a proactive and forward-thinking role in creating an expanded future Internet, such as the Internet2 Project, which is being planned now by a consortium of universities, government agencies, and private sector companies.[22]

Various national professional and industry trade associations have increased their attention to developing the Internet Economy. Within this group are efforts by the American Electronics Association, the Information Industries Association, and other associations. State and local governments and a growing number of economic development organizations (EDOs) nationwide are now exploring new ways to promote Internet-based economic development.[23]

Understanding The Internet

The Internet (Net) is a vast and rapidly growing network of computers that spans the globe. The early roots of the Internet date back to the late 1960s when the system was created as a way to connect various United States Defense Department researchers across the country and globally. The World Wide Web (Web), only one component of the Internet, is the graphical interface portion of the Internet. This is the part of the Internet that is best known by most people. Estimates of the Web's share of total Internet traffic vary widely, ranging from 60-85 percent of total Internet traffic.[24] The Web is one of several networks, including email (Simple Mail Transfer Protocol, or SMTP), file transfer protocol (FTP), gopher space, telnet, finger space, and others that comprise the Net.[25] This monograph is principally concerned with the growing commercial role of the Internet in industries and markets. The vast majority of this activity occurs on the Web.

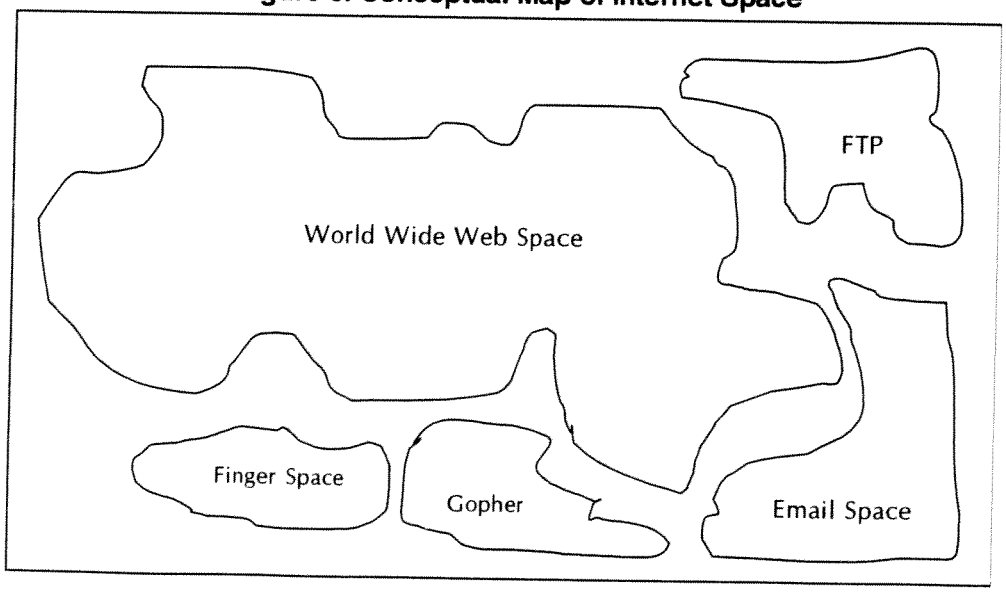
The Internet consists of various user spaces that exist separately and in interaction with one another. Any site you may visit on the Internet is located somewhere on somebody's computer hard drive. While Internet users have access to several parts of the Internet, the Web and email space are the two most commonly accessed spaces. Currently, most users access the Internet through personal computers (PCs). IDC Research, a national Internet market research company, estimates that nearly 62 million people in the United States will access the Internet by wireless devices by the year 2003. This optimistic forecast suggests that the wireless Internet may even surpass the PC Internet at that point.[26] What does this say about the future Internet role of your desktop or laptop computer?

Most people today gain access to the Web through an Internet Service Provider (ISP), which connects their computer at home or work to a central computer, or server, which in turn connects their computer to the Internet. According to Internet.com's Internet Service Providers (ISPs) List, over 8,700 US companies currently provide Internet access services nationwide and globally.[27] This number is expected to continue to grow and reach over 10,000 within the next 12-18 months. With over 20 million customers, America Online (AOL) is by far the largest ISP worldwide.

Internet.com's ISP List indicates that 725 commercial ISPs, such as AOL, MindSpring, and Ameritech, serve business and residential Internet users in the 216, 440, and 330 telephone area codes, which make up most of the 13-county Northeast Ohio region.[28] Is this too many, not enough, or just about the right number of Internet service providers? At this point, nobody knows how to answer this question. This estimate would appear to be a conservative number since many very small ISPs do not show up on anybody's list. Actual data on the regional market share of these ISPs is not publicly available.

Once connected to the Internet, which websites do users visit most often? The top portal sites continue to dominate the traffic rankings in the world's major Internet markets, according to the research company Media Metrix.[29] Yahoo is one of the five most visited sites in all of the countries monitored while Microsoft Network, America Online, and Geocities are all very popular. Microsoft, Hotmail, and ICQ applications were also ranked highly by many users. Many companies keep tabs of who is visiting which sites. This is vitally important information in the new "attention economy," where everyone is trying to attract more visitors to their Internet websites.[30]

Figure 3: Conceptual Map of Internet Space[31]



Several researchers have attempted to

map Internet space. Figure 3 below provides a conceptual map of the Internet and its various components. This map was adapted from an earlier one prepared in 1994 by Internet researcher John December.[32]

The conceptual view of the Internet in Figure 3 identifies the major user spaces found on the Net. It may be easier to think of the Internet as an information and communications bridge that connects the information world located in Northeast Ohio to the larger information world that exists globally. Businesses, institutions, government agencies, and households can use this "bridge" to connect themselves to computerized resources located in all countries on all continents.

Northeast Ohio should use the Internet to build new "bridges" to global resources and markets that help make its major existing and emerging industries more competitive in the future. The Internet can provide the information superhighways needed to build the next generation of globally competitive industries within the region during the next decade. One far-reaching development of the Internet is that all industries, including manufacturing, services, retail trade, and even education, are rapidly becoming global industries from a market perspective. By using Internet-based technologies, these companies can more efficiently organize themselves to inform and support their customers worldwide.

Steel, industrial equipment, manufactured parts and components, and a myriad of other industrial products are currently being sold, and to a lesser extent traded through barter, via the Internet. Bartering is an old idea with potentially bright new prospects for regional companies when coupled with the power of the Internet. A recent article in the business magazine, *Business 2.0* states that some 250,000 US companies barter bilaterally or through barter exchanges. Mohan Sawhney, a distinguished Professor of Electronic Commerce and Technology at Northwestern University, believes that "barter could change the face of global e-commerce, particularly if regulatory and exchange rate issues are thought through."[33]

Will this new growth associated with the Internet result in any new economic growth for nations, states, and local/regional economies? An article in the Federal Reserve Bank of Cleveland's *Economic Commentary* argues that countries inhibiting the quick integration of new technologies pay a price in slower economic growth.[34] The authors of that article also argue that the level of Internet use is a valid indicator of the absorption of computer technologies and that faster technology absorption leads to increased economic growth. This observation also can be made about economic regions like Northeast Ohio. We should be looking at the Internet as a new economic development tool for the region, as Figure 4 illustrates.

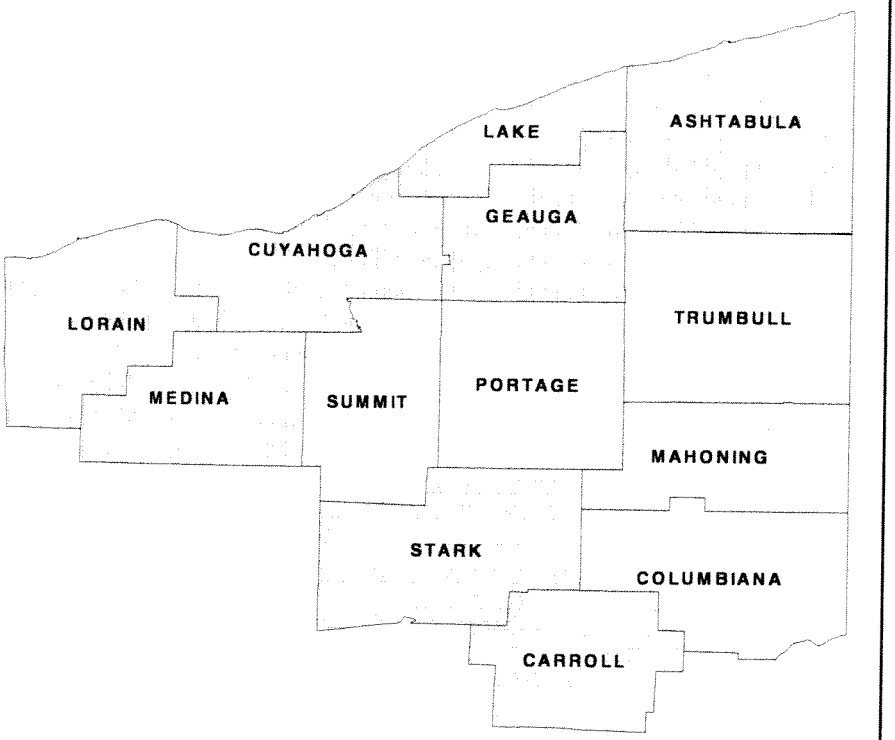
Figure 4: The Internet and Northeast Ohio's Economy

Northeast Ohio Geographic Area

We now shift our attention to an examination of the major economic trends in the Northeast Ohio region, which provides essential information in gauging the future impact of the Internet industry sector on the region.

Northeast Ohio is comprised of 13 counties located in the northeastern corner of Ohio. (See Figure 5.) These 13 counties are associated with four metropolitan areas within the region. Taken as a whole, these counties represent a major influence on the State of Ohio's economy, and they make significant contributions to the national and international economies. This is a very important perspective to bear in mind as we consider the future role of the Internet industry sector in the Northeast Ohio region.

Figure 5: Northeast Ohio Region Counties



Historically, Northeast Ohio had strong geographic location advantages for industry and commerce. While geographic location remains a source of competitive advantage for many regional industries, its influence has steadily diminished over the past two decades, and will continue to decline in importance in the future. Other economic development factors—namely human resource talents, technology, information and communications infrastructure, and market knowledge—will grow increasingly important as future business and economic success factors. These changes in competitive advantage are not unique to Northeast Ohio, since most regions are experiencing similar changes.

Three economic development strategy examples are worthy of Northeast Ohio's economic leaders' attention as they consider future Internet industry impacts on Northeast Ohio. First, the Pittsburgh Regional Alliance's (PRA) Digital Greenhouse Initiative provides a valuable example of how to couple information technology innovations with regional economic development marketing. This initiative is more than hype, as evidenced by Pittsburgh's significant university and company Information Technology (IT) strengths.

Second, the Michigan Economic Development Corporation's (MEDC) new economic development strategy soundly recognizes the role of new IT technologies in strengthening Michigan's old-line manufacturing base. Both Pittsburgh and the State of Michigan have mounted Internet Age workforce development strategies that focus appropriately on "talent" and not simply job skills as the crucial ingredient for future value-added growth.

The third example comes from the Bay Area Council in Northern California. The Council's new Winning in the New Global Economy strategy does a very effective job of uniting technological prowess, global markets, high quality jobs, and quality of life. Many other places have mounted effective strategies for the New Economy. Ultimately, Northeast Ohio must craft its own in light with its unique identity and assets. The Internet industry sector should be a component of this region's future strategy.

Northeast Ohio Economy Framework

NortheastOhioEconomy.com provides some new ways to think about economic development in the Northeast Ohio region in the context of the emerging Internet industry sector. Figure 6 identifies how the regional economy currently functions in a trading context. The Internet will give a huge boost to trade on a global scale. Northeast Ohio must increase its world trade linkages to stimulate future economic growth. Greater attention must be given to "market building" as a strategy to produce better jobs, more income, and other economic opportunities for residents.

The economic model in Figure 6 identifies how the components of the regional economy interact in fulfilling the demands for private and public goods and services. The model simplifies all markets into four broad groups: business, government, institutional, and household or residential. Various industries are involved in accomplishing these inter-regional and international trade transactions. For example, transportation and distribution industries move goods (physical products) and services (information) from one location or user to another. The Internet industry sector, through a wide variety of electronic business (e-business) applications and technologies, is dramatically changing the relationships among these industries and firms as they engage in trade activities. What follows is an assessment of the regional economy and the major trends that will characterize its future growth pattern.

Figure 6: Northeast Ohio Economy - Market Trade Model

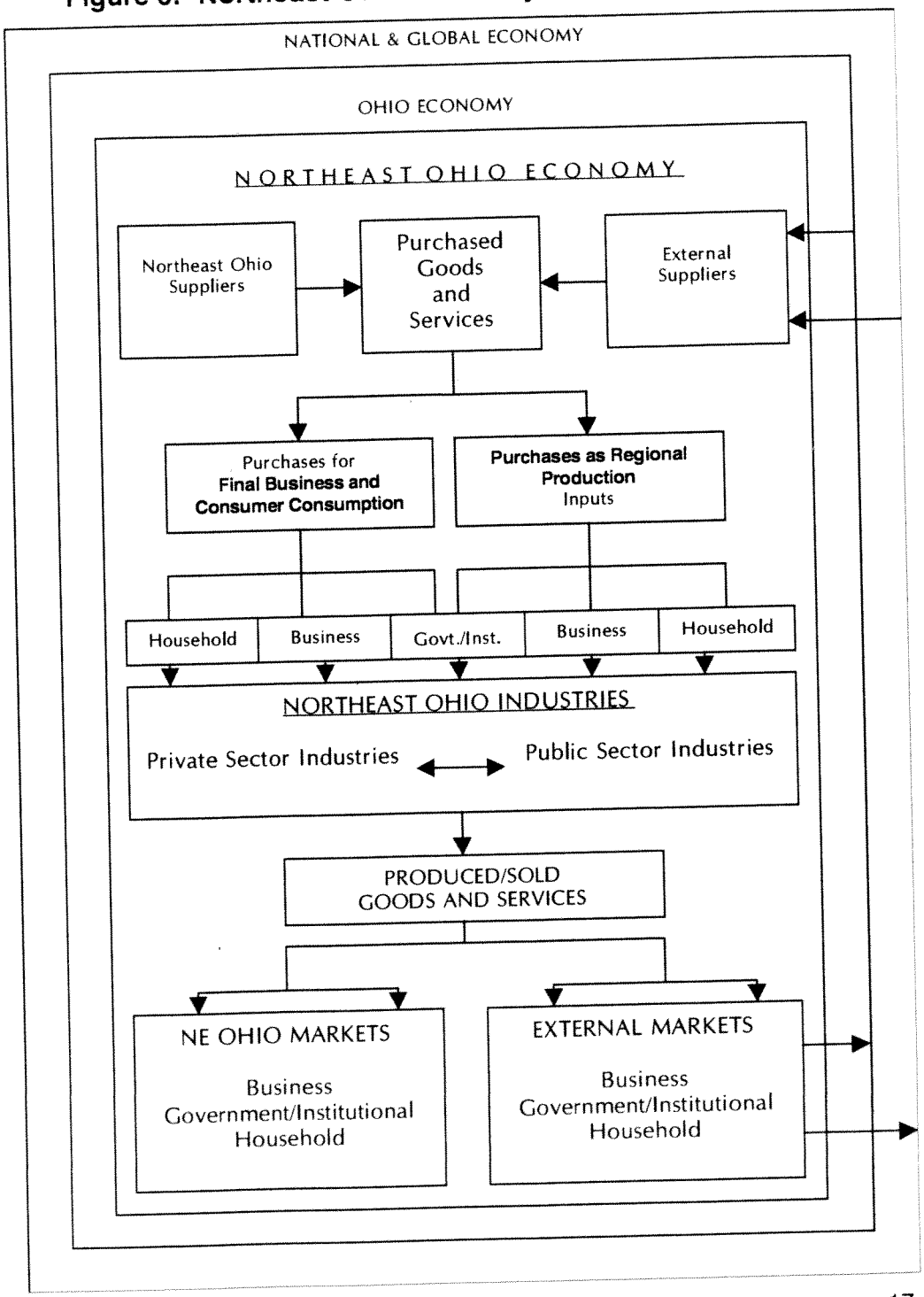


Table 1: Northeast Ohio Regional Population and Income

Metropolitan Area	Total Population[37]	% Region's Total Population	Total Personal Income[38] ($Billion)	% Region's Total Personal Income
Cleveland-Lorain PMSA[39]	2,222,952	56.9	$60.84	61.0
Akron PMSA[40]	688,952	17.6	$17.08	17.2
Canton-Massillon MSA[41]	402,207	10.3	$9.09	9.1
Youngstown-Warren MSA[42]	591,752	15.5	12.86	12.9
NE Ohio Totals	3,905,642	100.0	$99.9	100.0

Population and Personal Income

The 13-county Northeast Ohio region has a total population of 3.9 million people, who represented nearly 35 percent of Ohio's total population and 1.4 percent of US total population in 1998.[35] The region's $99.8 billion in total personal income represented almost 37 percent of the state's total personal income and 1.5 percent of US total personal income in 1997.[36] Table 1 identifies the shares of regional population and personal income accounted for by the four metropolitan areas located in Northeast Ohio.

The Cleveland-Lorain Metropolitan Area holds commanding shares of the region's total population and personal income with nearly 57 percent of its population and 61 percent its total personal income. The other three metro areas account for the remaining 43 percent of regional population and 39 percent of regional total personal income.

Regional Economic Output and Employment

Northeast Ohio's economy has a total economic output value of $116 billion.[43] This figure represents 34.6 percent of Ohio's gross state product (GSP). This economic output employed 1,968,000 people. On average, each job produced nearly $59,000 in regional economic output in 1998.

The Cleveland-Lorain PMSA accounts for over 61 percent of the region's total economic output and over 60 percent of the region's total employment. As a group, the other three metropolitan areas in the region account for the other 39 percent of total regional economic output and 40 percent of the region's total employment.

Table 2: Northeast Ohio Regional Economic Output and Employment

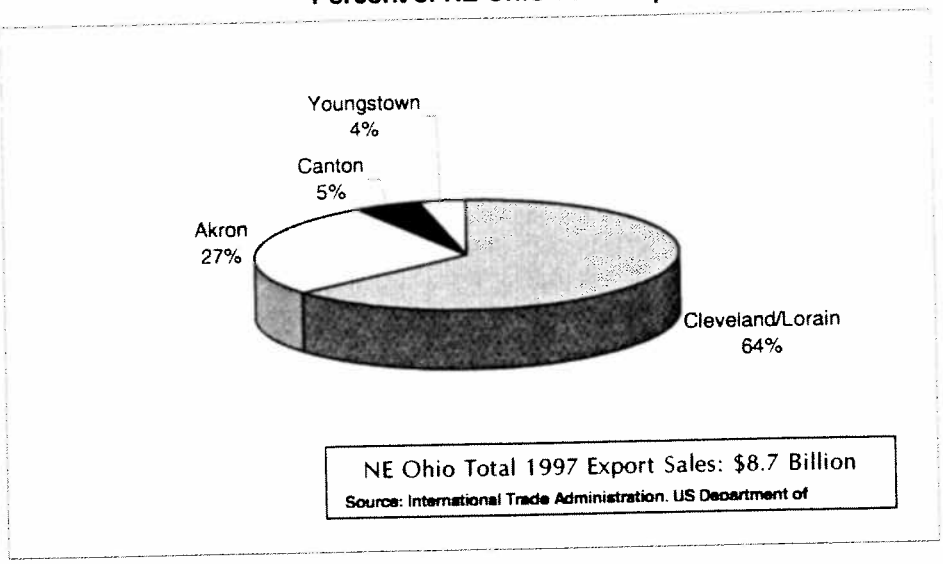
Metropolitan Area	Economic Output[44] ($ Bil.)	% NEO Economic Output	2000 Employ.[45] (000)	% NE Ohio Employ.	2010 Employ[46] (000)	% NE Ohio Employ.
Cleveland-Lorain PMSA	$71.1	61.1%	1190.7	60.5%	1301.0	60.8%
Akron PMSA	$19.1	16.4%	333.4	16.9%	364.7	17.0%
Canton-Massillon MSA	$11.2	9.6%	188.8	9.6%	202.8	9.5%
Youngstown MSA	$14.8	12.7%	255.2	12.9%	270.9	12.7%
NE Ohio Totals	$116.2	100.0%	1968.0	100.0%	2139.4	100.0%

International Trade Activity

Export sales are vital to regional economic growth because they bring new income into the region to support local businesses, households, and governments.[47] Internet commerce will have a major impact on the growth of the global economy in the next decade. It will help companies currently engaged in international business to expand their international markets, and it will enable a wide variety of companies not currently selling to international markets to do so in the future. Even downtown retailers that have historically relied upon walk-in customers for business will be given the opportunity to sell their goods and services to customers abroad through the Internet.

Figure 7: Metropolitan Area 1997 Merchandise Exports

Percent of NE Ohio Total Exports



Internet commerce contributes to Northeast Ohio economic growth to the extent that it: 1) brings more externally generated income into the region than locally generated income it sends outside the region; and 2) adds to the productivity, quality, and innovativeness of Northeast Ohio businesses, residents, local governments, and institutions, and by doing so, conserves local financial capital and other economic resources. Later in this report, I talk about how to apply the balance or trade (payments) to Internet-based regional economic development strategies.[48]

Most of Northeast Ohio's current major exporters are manufacturing businesses. Some are also business/management services, engineering, and technical service firms that have followed their US clients into international markets, or have developed new service accounts with foreign clients. Figure 7 identifies the current value of merchandise export sales by Northeast Ohio businesses.

Table 3: NE Ohio Metropolitan Area Job Performance Comparisons

Metropolitan Areas	1990 Emp	2000 Emp	2010 Emp	1990-00 % Chg	2000-10 % Chg	Rank 1990-00	Rank 2000-10
Cleveland	1090.1	1190.7	1301.0	8.4%	8.5%	9	9
Akron	289.9	333.4	364.7	13.0%	8.6%	4	8
Canton	170.4	188.8	202.8	9.7%	6.9%	7	10
Youngstown	233.0	255.2	270.9	8.7%	5.8%	8	11
Pittsburgh PA	1041.5	1100.3	1206.1	5.3%	8.8%	10	7
Cinn. OH-KY-IN	772.7	901.9	1016.1	14.3%	11.2%	3	5
Columbus OH	714.3	859.8	976.1	16.9%	11.9%	1	4
Indianapolis IN	741.0	872.6	1008.1	15.1%	13.4%	2	1
Milwaukee WI	771.0	878.4	1005.7	12.2%	12.7%	5	2
Detroit MI	1935.7	2193.3	2466.4	11.7%	11.1%	6	6
Buffalo-Niag. NY	557.8	589.2	598.6	2.0%	4.6%	12	12
St. Louis MO-IL	1225.2	1357.5	1542.6	9.7%	12.0%	7	3
Baltimore MD	1195.2	1240.2	1395.4	3.6%	11.1%	11	6

Source: CSU Urban Center analysis, Regional Financial Associates data

Northeast Ohio Compared To Selected Competitor Regions

Northeast Ohio's metropolitan areas compete with many other US metropolitan areas for new economic development resources and opportunities. A recent illustration is the growing competition among midwestern metropolitan areas for passenger air service market share. Greater Cleveland is currently examining facility options to expand its airport operations in order to better serve domestic and international markets. Northeast Ohio metro areas compete with various other United States regions for business investment projects, government infrastructure funding, university research projects, and a host of other opportunities that could further energize the regional economy. Table 3 presents data on job growth performance for the 1990-2010 period for Northeast Ohio's metro areas and selected competitor areas in Ohio and other states. These performance numbers provide some indication of how well Northeast Ohio is faring in the larger economic development competition.

The metro areas selected for comparison purposes represent three types of economic regions: 1) metro areas that resemble Northeast Ohio metro areas in terms of economic base composition (Milwaukee, Cincinnati, St. Louis, Buffalo); 2) growing state capitals with significant technology industry concentrations (Columbus, Indianapolis); and 3) diversifying metro areas with growing technology concentrations that provide useful benchmarks for Northeast Ohio metro areas (Pittsburgh, Baltimore, Detroit). Four of the metropolitan areas selected – Indianapolis, St. Louis, Detroit, and Pittsburgh – were selected as Tech-Poles in the Milken Institute's recent study on the high technology sector and US metro area growth.[49] There were no Northeast Ohio metropolitan areas selected as Tech-Poles by the Milken Institute report, which is food for thought as we attempt to sort out how much benefit the Internet industry sector will provide to Northeast Ohio.

The results in Table 3 indicate that Northeast Ohio's metropolitan areas performed poorly in total job growth performance during the 1990-2000 period, and that they are not expected to do much better in the 2000-2010 period, with the possible exception of the Akron area, which is expected to improve some. Within the group, Columbus, Indianapolis, and Cincinnati led the way in job growth during the 1990-2000 period; Indianapolis, Milwaukee, and St. Louis are expected to lead employment growth in the next decade. Historically, the Columbus area has been Ohio's fastest-growing large metropolitan area. Indianapolis has performed well since the late 1970s, although growth has cooled down some in the region during the 1990s. From the standpoint of economic base structure, Indianapolis and Columbus share strong similarities with one another as state government capitals with major educational and business service industry concentrations. Cincinnati, Milwaukee, and St. Louis are more similar in economic structure to the Cleveland-Lorain area, all of which started as older industrial regions that have experienced considerable economic diversification over the past quarter-century.

What is the significance of these findings to this assessment of the Internet industry sector in Northeast Ohio? First, the employment forecasts suggest that Northeast Ohio's metropolitan economies will perform even worse relative to competitor areas in the next decade than they did in the last. A similar conclusion was expressed in a recent *Cleveland Plain Dealer* article that explored whether Greater Cleveland is positioned for growth in the new economy.[50] While forecasts are not necessarily destiny, these results signal that Northeast Ohio is going to continue its struggle to jump-start regional economic growth in the future.

These findings draw attention to the significant underlying competitiveness problems that Northeast Ohio's metropolitan areas will confront in the next decade. The six major ones are: 1) over-concentration in mature, slow-growing manufacturing industries; 2) weak growth in the region's technology industry sector; 3) over-reliance by both regional manufacturing and service industries on traditional domestic markets; 4) weakening service sector due to corporate mergers, acquisitions, and restructuring; 5) older public infrastructure system with many shortcomings in supporting technology-based industry growth; and 6) weaknesses in educational and skill backgrounds of the regional workforce.[51]

Regional economic development leaders should be asking how these conditions will affect the future role of the Internet industry sector within the region. Two avenues of thought should be considered in this regard. The first avenue is that we should be exploring ways in which the Internet can be used to overcome major competitive shortcomings in the future. For example, how can Internet-based marketing aid both manufacturing and service businesses to increase their future global market share? The second avenue is that we should be looking at how these limitations could reduce the region's potential to develop Internet commerce opportunities in the future. For example, how will the region's

weak technological infrastructure and lower educational attainment levels impair the growth of Internet businesses in the region? These and related issues are discussed in greater detail later in this monograph.

Further insights into the region's economic growth performance problems are provided by a recent study of Ohio employment performance by researchers at the CSU Urban Center and the Urban Studies Center at Wright State University.[52] The CSU-WSU study finds that Northeast Ohio's metropolitan areas have lagged behind other Ohio major metropolitan areas in employment growth since 1965.

These findings suggest that the region will need to alter or augment its current economic development strategy in the future if better economic results are to be achieved. Despite current efforts by area universities, industry associations, technology centers, and economic development organizations, Northeast Ohio is far from ready to capitalize on the technological and commercial opportunities offered by the Information Technology (IT) sector. Nor is the region ready to deal with the possible threats posed to existing old-line industries by new electronic business strategies.

The 1999 Milken Institute report says that the "high-tech sector stimulates the non-high-tech sector of a metropolitan economy." The fact that the Cleveland area and Akron area ranked 256 and 246, respectively, out of 315 metropolitan areas studied by the Milken Institute may explain in part Northeast Ohio's overall weak economic performance.[54] The relevant question here is: How well can the region expect to perform in the Internet industry sector in light of these technological shortcomings? Without the proper strategy, the region is not likely to attract and develop much growth in Internet-related industries.

Table 4: Ohio Metro Area Employment Growth Comparisons, 1965-1996[53]

Ohio Metro Area	Total Job Growth %	Total Job Growth Rank	Manufacturing Job Growth %	Manufacturing Growth Rank
Cleveland	37	7	-31	7
Akron	61	5	-27	6
Canton	49	6	-26	5
Youngstown	25	8	-40	8
Columbus	148	1	-11	1
Cincinnati	91	2	-19	3
Dayton	63	4	-24	4
Toledo	72	3	-12	2

Ohio Employment Trends: Historical Perspectives and Projections, CSU Urban Center Working Paper, Summer 1999. (Ziona Austrian, John Blair, Adina Wolf, and John Zipp)

Are We Headed Toward a NortheastOhioEconomy.Com?

Is the entire regional economy headed in the direction of becoming a dot.com economy? Not hardly, but the influence of Internet technology and commerce will grow steadily in Northeast Ohio.

The Net is an exciting "new frontier" where people currently have considerable freedom to experience themselves and their world in unique and powerful ways. The decisions we make today about the Internet's infrastructure capacity, access, and published content will have great consequences on our future freedom to explore and use this new frontier. While no organization or country regulates the Internet, a variety of national and global organizations, including the National Telecommunications and Information Administration (www.ntia.gov), the World Trade Organization (www.wto.org), The Internet Society (www.isoc.org), and numerous others, are attempting to make crucial public policy decisions that will shape the future Internet.

Many people are infatuated by what they can learn and experience on the Internet. Some say it is so good that it is even addictive.[55] Tremendous attention is being given across the world to understanding and tapping the enormous potential of the Internet. This is evidenced by the phenomenal growth of personal computers and software, the dramatic increase in subscriptions to Internet Service Providers (ISPs), the exponential growth in the number of Internet websites created by individuals, businesses, and institutions, the explosive growth of e-commerce and e-business worldwide, and even by the language that we use in everyday life to describe our world.

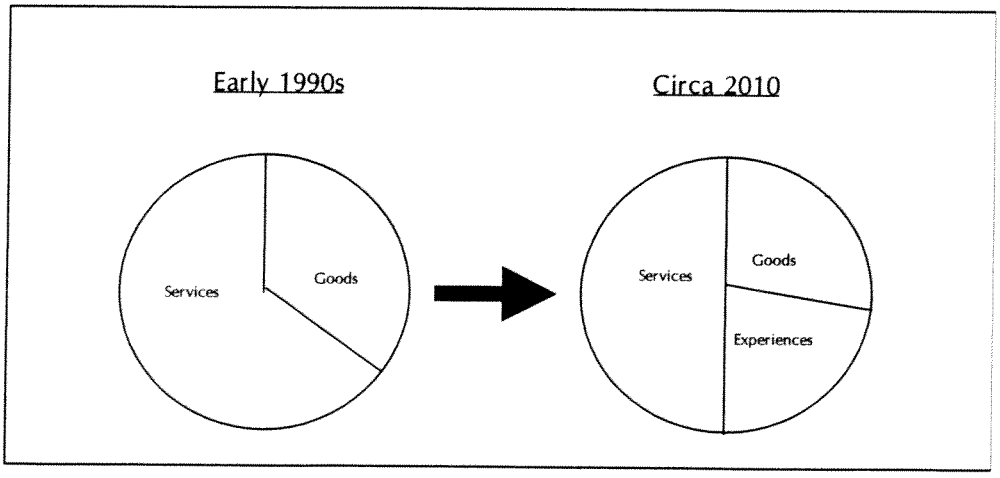
The Internet has amazing power to help us capture our experiences in digital form and allow us to re-experience our world in new and different ways. The digitalization of our "experiences" is growing in many industries, as Joe Pine and Jim Gilmore describe in their book *The Experience Economy: Work Is Theatre and Every Business A Stage.*[56] The entertainment industry is probably the most advanced in applying Internet-based technologies to entertain us through interactive games and other online activities. The movie and music industries are making rapid strides in using the Internet as a strategy to entertain people. Many other industries will be ready soon to follow Hollywood into cyberspace.

According to Pine and Gilmore:

> Experiences represent an existing but previously unarticulated genre of economic output. Decoupling experiences from services in accounting for what businesses create opens up possibilities for extraordinary economic expansion—just as recognizing services as a distinct and legitimate offering led to a vibrant economic foundation in the face of a declining economic base. And a new base is emerging. Ignore the familiar hype: Information is not the foundation of the New Economy, for information is not an economic offering. Information wants to be free. Only when companies constitute it in the form of information services—or informational goods and informing experiences—do they create economic value.

Northeast Ohio Internet users must be ready to capitalize on these "experience economy" opportunities in the future. Figure 8 illustrates the economic shift that Pine and Gilmore foresee. This is the shift from viewing the economy as comprised of goods and services to being comprised of goods, services, and experiences. Disney Enterprises recognized this development in the 1950s with the widespread adoption of the television by the majority of American households. The rapid growth across the United States in personal computer use and Internet access is enabling the next development phase of the experience economy.

Figure 8: Experience Economy Shift



The Internet will affect nearly every place everywhere in the world eventually—Northeast Ohio is just one of them. Place still matters, even to the seemingly "placeless" Internet, and it will continue to matter in the Digital Age. Geographic places across the world have been greatly affected by the Internet's growth and development over the past 30+ years. The Internet will not remove our need for a sense of physical place in life, rather it will greatly increase the geographic options open to us as we organize and conduct our lives. The Web will spur rivalry among places, while also stimulating greater connection and collaboration between and among geographic places globally as they discover their existing common interests and create new ones.

The Internet was born in 1969, which coincides with the time when Northeast Ohio's largely manufacturing-dominated economy began to unravel in the face of changing technology, global markets and competition, and growing cost-reduction pressures on regional companies and their workers. First, the mainframe computer, then the personal computer (PC), and now an endless stream of Internet-based innovations have transformed the type of work we perform, as well as how and where we work. Where will all these changes take us in the next 30 years?

Economic development organizations (EDOs) serving Northeast Ohio, including chambers of commerce, utility companies, city and county development departments, neighborhood development organizations, colleges and universities, and other groups, will change how they provide service to companies and communities in the future. The Internet will be more important to these EDOs' work as specialized online databases, applications software programs (ASPs), and other systems emerge to better serve business requests for site selection data.

The economic development process has always been driven by new technology. Technology drove our national economic development throughout the past century, and it was also the main driver in Northeast Ohio's economic development. Our future regional prosperity will hinge on how effectively we make use of new information technologies and applications as tools to communicate, relate, learn, and work in the future.

Northeast Ohio businesses and governments must master the basic skills in using existing Internet-based tools and systems. In short, we must become skilled "tool users." This challenge is analogous to those we faced in earlier industrial revolutions. Our opportunity in this first step is to use our "consumer and business market power" to attract new and valuable Internet-based products, services, and resources that will help our regional economy grow stronger in the future.

We must also become innovative local developers (builders) of new Internet tools that help people, organizations, and industries. In other words, we must become "producers" of these technologies and new commercial applications. Our opportunity in this second step is to use our "market-building power" as producers and suppliers.

Northeast Ohio is not the Silicon Valley. It is highly unlikely that our region will ever amass the computer and electronic muscle found there. This is not even a meaningful economic development goal to consider for the region. But should the region develop its technological strengths as a future strategy for economic development? Absolutely.

The Internet Industry Sector: Some Starting Assumptions

Much remains unknown about the extent and future growth direction of the Internet nationally and worldwide. For this reason, it is exceedingly hard to forecast which path it will follow in the future. In the absence of these facts, we must make reasonable assumptions about where the Internet and the economic activities associated with it are headed in the next decade. After many interviews and an exhaustive literature review, this monograph makes the following assumptions about the future of the Internet sector:

1. Interest in the Internet industry sector is tremendously high at the present time and still growing. This sector is not currently well understood by industry, government, university researchers, or the economic development community. Many people are currently trying to develop a definition of the industry's organization and performance.[57] Many state and regional economic development organizations have identified e-commerce and e-business as targets of opportunity for future growth, but most have not done an effective job of defining this emerging sector of the economy.

2. Internet usage by businesses, governments, major institutions, and individuals is currently growing very rapidly nationwide and globally and will continue to do so over the next decade.

3. As we tackle future cost, technical, and personal value hurdles, Internet technologies and applications will become highly integrated components of most aspects of our daily lives at home, work, and other life settings.

4. Electronic business (E-B) activities will grow very rapidly in the future, assuming that these activities continue to offer strong economic advantages to businesses and consumers. E-B strategies will become an integral component of most aspects of business.

5. The basic Internet infrastructure must be expanded and enhanced through ongoing strategic investments by government, education, and business if we are to accommodate anticipated future business and personal Internet uses. A real threat exists of exceeding the Internet's current capacity to support anticipated future commercial growth.

6. Eventually the tax system will catch up with Internet commerce and most types of e-business transactions will be taxed in the future. (One tax policy approach we should consider is a "gasoline tax concept" for the Internet, which allows for a significant portion of these taxes to be reinvested in building and maintaining the highway infrastructure. If we plan to tax Internet commerce in the future, then a portion of these revenues should be used to invest in future Internet infrastructure improvements.)

7. Finally, the Internet industry sector will evolve rapidly as a dynamic integrated sector of the global economy. The Internet industry sector will give a tremendous boost to world trade and investment in most industries. One major question raised by this growth is its short and long term impacts on local and regional economies worldwide. This should clearly be a future concern for Northeast Ohio economic leaders and citizens.

Basic Facts About Internet Use In Ohio

Recent surveys conducted by the University of Akron's Institute for Policy Studies for the ECom-Ohio Project provide general estimates of Internet usage by Ohio residents and businesses.[58] The Ohio Citizens Online survey results indicate that Ohio and Northeast Ohio residents are about average in their Internet usage compared to the nation. The survey of Ohio citizens found that:

1. Ohio citizen computer ownership is comparable to the national rate, which is about 48 percent of Ohio's total population. An estimated 47 percent of Northeast Ohio residents own a computer, which is slightly below the statewide average, and considerably below the 57 and 56 percent ownership rates for Central and Southwest Ohio respectively.

2. Overall, 42 percent of Ohio citizens use the Internet, which is about the same as the national average. Just less than 41 percent of Northeast Ohio residents use the Internet.

3. The overall rate of Internet purchasing is low at 16.4 percent across Ohio, but this level is comparable to the national average.

4. Ohio citizen uses of the Internet are similar to those uses made by the national population. Email is the dominant use of the Internet. Business use of the computer by Ohio citizens at home is not significant at this time.

The Ohio Business Online survey results, on the other hand, suggest that Ohio and Northeast Ohio businesses are significantly below average compared to the nation in their Internet usage. Forrester Research found in its 1999 national business survey on Internet use that 60 percent of surveyed firms had websites and another 35 percent were using the Internet for some type of businesses transactions. The survey of Ohio businesses found that:

1. Roughly two-thirds of Ohio and Northeast Ohio companies use computer technology.

2. One-quarter of Ohio companies make regular use of the Internet. Almost 29 percent of Northeast Ohio companies use the Internet regularly.

3. Less than 15 percent of Ohio companies have websites. The same percentage of Northeast Ohio companies currently operate business websites.

4. Variation in computer technology by Ohio companies is not significant across state regions.

5. Variation in Internet, Web, and Electronic Data Interchange (EDI) links with customers is significant.

6. Finally, Ohio international business exporters are much more likely to use computer technology and the Internet than Ohio companies that just serve the US market.

Accurate measures of Internet usage by individuals and businesses are very difficult because of data collection problems, concerns about privacy and confidentiality, and because the Internet is changing very rapidly, causing measures and estimates to be outdated quickly. The Business Online estimates suggest that a less advanced business computer and Internet user population exists in Ohio than would seem reasonable. From this study's research, I would expect Ohio businesses to conform fairly closely to national trends in business Internet use. Additional perspectives on business and residential Internet usage are offered later in this report.

A number of public and private studies of Internet usage have been conducted. Several companies and nonprofit organizations, like the Internet Society, the Online Computer Library Center, Forrester Research, McKinsey and Company, and Nua Internet Surveys attempt to monitor Internet usage through regular surveys and estimates. Two recent commercial studies indicate that a much higher percentage of all US businesses are using the Internet and that these uses reflect much more advanced applications than those identified by the Ohio Business Online survey.

A 1999 study[59] of a very wide cross-section of national industries by Computer Economics (Mountain View, CA) found that business investments in Internet-related technology and services is growing very rapidly. Here are some of the main findings:

1. 60.7 percent of large companies plan to increase their future information technology (IT) budget.

2. 68.6 percent of medium-sized companies anticipated future IT budget increases.

3. 60.4 percent of smaller companies expected IT budget increases.

A second joint study[60] of business Internet use by the Kelsey Group and ConStat found that 64 percent of the estimated 8-10 million small businesses across the country now use the Internet to enhance their operations. Low computer prices and inexpensive Internet connections were cited as factors driving this increase in small business Net usage.

The findings of these two studies suggest that the level of Internet use by Ohio businesses may be higher than that characterized by the Ohio Business Online survey. The Ohio survey results suggest that Ohio businesses are making less use of the Internet than their business counterparts in other states. This monograph argues that Ohio businesses are probably about the same as businesses in other states. The Computer Economics study points to aggressive IT investment activity by US businesses in the near future. The Kelsey Group and ConStat study indicates that smaller companies across industries are increasing their use of the Internet very rapidly.

Defining The Internet Industry Sector

What is the Internet industry sector? An initial definition was offered earlier in this monograph. I have chosen to define the Internet industry sector as the rapidly growing global network of networks of Internet-based resources and tools, virtual communities, and advanced information and communications technology industries that are playing a growing role in facilitating business and economic decisions and transactions by organizations and individuals.

The Center for Research in Electronic Commerce at The University of Texas' Graduate School of Business has defined the "Internet Economy" as being comprised of four related industry layers.[61] This definition is quite useful in understanding relationships among industries directly comprising this new and evolving economic sector:

1. Internet Infrastructure Layer: This layer includes many companies that help create the Internet Protocol (IP)-based network infrastructure, which is vital to all types of access and use of the Internet itself. Within this layer, there exist several categories of activities:

a. Internet backbone providers (e.g., Quest, MCI Worldcom)

b. Internet service providers (e.g., Mindspring, America Online)

c. Networking hardware and software com panies (e.g., Cisco Systems, Lucent, 3Com)

d. Personal computer (PC) and server manufacturers (e.g., Dell, IBM, Compaq, Gateway)

e. Security vendors (e.g., Axent, Check point, Network Associates)

f. Fiber optics manufacturers (e.g., Corning)

g. Line acceleration hardware manufacturers (e.g., Ciena, Tellabs, Pairgain)

A variety of national and global companies belonging to this layer have a service presence and sell to customers in Northeast Ohio. With the exception of some locally based Internet service providers and a few custom computer builders, the region is not well represented by locally based companies in this layer.

2. Internet Applications Layer: This layer is composed of products and services above the IP network infrastructure that make it technologically feasible to perform various business activities online. This layer includes:

a. Internet commerce applications (e.g., Microsoft, Sun, Netscape, IBM)

b. Internet consultants (e.g., USWeb/CKS, Scient)

c. Multimedia applications (e.g., RealWorks, Macromedia)

d. Web development software (e.g., Adobe, NetObjects, Allaire, Vignette)

e. Search engine software (e.g., Inktomi, Verity)

f. Online training (e.g., Sylvan Prometric, Assymetrix)

g. Web-enabled databases (e.g., Oracle, IBM DB2, Microsoft SQL Server)

A review of the Northeast Ohio Software Association's directory indicates that a limited number of locally based companies belong to this layer of the Internet Economy. Many Internet consultants are located in the region, but few applications firms are located here.

3. Internet Intermediary Layer: This layer includes businesses that increase the efficiency of digital markets by bringing together buyers and sellers over the Internet. This layer includes:

a. Market makers in vertical industries (e.g., VerticalNet, FreeMarkets Online, PCOrder, others)

b. Online travel agents (e.g., Microsoft Expedia, BizTravel Online, TravelWeb.com, and many others)

c. Online brokerages (e.g., E-trade, Charles Schwab, others)

d. Content aggregators (e.g., Cnet, Zdnet, Broadcast.com)

e. Portals/Content providers (e.g., Yahoo, Excite, Geocities)
f. Internet ad brokers (e.g., Doubleclick, 24/7 Media)
g. Online advertising (e.g., Yahoo, ESPNSportszone)

There is some representation in this layer by Northeast Ohio-based companies in the areas of online travel agents, brokerages, and a few business-to-business vertical market builders.

4. Internet Commerce Layer: This layer involves the sale of products and services to consumers or businesses over the Internet. This includes:

a. E-tailers (e.g., Amazon.com, eToys, CD Universe, many others

b. Manufacturers selling online (e.g., Cisco, Gateway, Ford, GM, others)

c. Fee or subscription-based companies (e.g., thestreet.com, Wall Street Journal, New York Times Online, others

d. Airlines selling online tickets and tours (e.g., Continental, United, others

e. Online entertainment and professional services (e.g., Disney, legal clients, many others)

A large number of these companies, like Microsoft, IBM, Cisco, Dell, and others, occupy more than one layer of the Internet Economy. Several small- to medium-sized Northeast Ohio companies are active in this layer of the Internet Economy.

Building Markets Through Internet Economic Development

The strategic development of the Internet industry sector is very important to the continued growth and vitality of Northeast Ohio's existing business and industry base, and it is extremely important to the further diversification of the regional economy in the future. As a starting point, business, government, and institutional leaders must see the Internet industry sector as a source of future economic development in the region.

The University of Texas at Austin group's definition of the Internet industry sector focused upon four layers of companies that interact to support and undertake a wide variety of economic transactions on the Web. Regional economic development groups should inventory regional companies to define more precisely where they fit into the four Internet industry sector layers defined by the University of Texas at Austin group. An additional view is needed to understand the economic development dimension of the Internet industry sector. This is described below.

The Internet industry sector consists of a wide variety of business and economic activities, having in most cases some geographic basis, which are enabled or supported by Internet technology resources. Historically, economic development has concerned itself with making people, businesses, and taxing jurisdictions located in specific geographic areas, like the Northeast Ohio region, more competitive and prosperous. Traditional economic development activities have relied heavily upon geo-political boundaries as their primary guides for investing economic development resources. The costs and benefits of these investments have been measured within a specific geographic context. In this sense, the majority of these actions are "place-based economic investments."

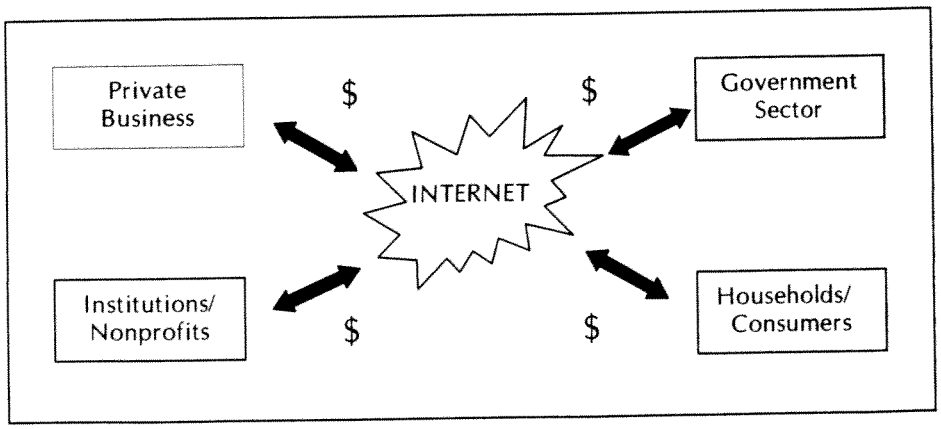
The Internet industry sector has the potential to trigger major changes in the "context" in which economic development opportunities are defined and how related investments are made by private citizens, businesses, governmental jurisdictions, and other groups. These changes must be clearly understood by all with an economic interest in particular geographic areas.

The Internet industry sector will have two conceivable impacts on place-based business and economic activities. First, it can "supplement" place-based activities with new technological capabilities that functionally improve or enhance these place-based activities. Those groups and individuals seeking to preserve existing technology, industry, occupational, market, and political boundaries and definitions will emphasize the "supplementary" role of the Internet.

Second, the Internet industry sector can "supplant" place-based activities if the Internet can provide better, cheaper, faster, or smarter solutions to problems. This is probably a larger source of concern to existing political and economic development communities in Northeast Ohio and nationwide. Those groups and individuals seeking to "over-turn the apple cart" by redefining industry, occupational, technology, market, and political boundaries will emphasize the "supplanting" role of the Internet in business and economic affairs. This monograph foresees that the Internet will have both "supplementary" and "supplanting" impacts on the Northeast Ohio region.

An example of a geographic-based, Internet-supported economic activity is the growing number of traditional manufacturing companies that are implementing business-to-business (B2B) electronic commerce strategies to perform various key business functions. For example in the automotive industry, Ford (AutoXchange) and General Motors (TradeXchange) recently made significant entries into the e-commerce world with the establishment of online trading sites. The drive to create these B2B markets was provided by the need for the automakers to decrease their costs in an increasingly competitive retail market by moving their B2B transactions online.

Figure 9: Internet Industry Market Segments



Because of the complex and rapidly changing nature of the Internet and its use by various segments of society, the Internet industry sector must be defined in broad terms that are sufficient to capture the many new developments that will occur in the future. The four major market groups using the Internet for research, information, learning, entertainment, communication, and business transactions are:

1. Business: All goods and service industry sectors.

2. Government Sector: All federal, state, and local government agencies.

3. Institutions/Nonprofits: Education, associations, nonprofits.

4. Households/Individuals: All domestic households.

A variety of service companies provide Internet connections, manage Web access and navigation, facilitate and manage online transactions, provide Web content, develop software, build websites, create other Internet tools, and provide various other Internet-related services to the four markets.

Business Market Segment

The Business Market Segment is comprised of two subgroups:

1. Specialized Internet Businesses: These are companies that provide Internet-related products and services to other businesses, or to government agencies, institutions, and households. This group includes e-commerce or e-business enterprises (EBs); Internet Service Providers (ISPs); software producers and publishers; data processing, programming, and computer services; telecommunication service and equipment; information technology equipment or product manufacturers; multimedia design and graphics companies; and other computer and information technology-related businesses. This subgroup includes companies in all four layers of The University of Texas group's Internet Economy model.

2. General Businesses: These are companies in any service or goods-producing industry making use of the Internet through internal company sources, including electronic data interchange networks (EDI), intranets, extranets, and other services, to facilitate business functions, such as sales and marketing, customer service and support, purchasing, and public information dissemination. Subgroup 1 would call businesses in Subgroup 2 their customers, and this is quite true.

It is important, however, to recognize that a great many companies that currently outsource Internet business and technology functions to new entrepreneurial companies will eventually provide at least a portion of these services for themselves. The business marketplace has followed this path on many occasions in the past. Just look at how large corporations have bypassed the public telecommunications network through the use of satellites and other technologies.

Government Market Segment

Most government activities are organized by geographic level into three major groups, which are identified below. It is important to recognize that these agencies, like businesses, are both users and providers of Internet services. These agencies will face important decisions about their future role in the Internet industry sector. We are beginning to see signs of these deliberations already as demand grows for publicly provided Internet services (Provider Role) and pressures increase for government at all levels to operate more efficiently and effectively (User Role). E-commerce solutions will be vital to these agencies' future competitiveness in the changing world of intergovernmental service.
The Internet industry sector is pushing many governmental agencies to rethink their value chains in order to understand how to use new Internet-based technologies to create greater value for the general public in areas like education, environmental protection, and economic development.

The Government Market Segment has three general layers:

1. Federal Government: Includes those agencies with offices based in Washington, DC and elsewhere across the United States and to some extent worldwide. The federal government has played a major role in funding Internet technology research, and it is currently working to devise appropriate public policies and tax rules to apply to the emerging Internet industry sector. The federal government is a major user of Internet resources across its vast inter-agency bureaucracy. An increasing number of federal services, such as Census data dissemination, IRS tax form processing, regulatory compliance monitoring activities, and other functions use the Internet.

2. State Governments: Includes various state government departments and agencies that provide public information and services to the general public, businesses, and other entities. State governments have a major push at the present time to get online and use the Internet as a resource to their business. Through the ECom-Ohio Project and other initiatives, Ohio's state government needs to identify new ways to utilize the Internet in its work.

3. Local Governments: Includes the extensive network of cities, counties, boroughs, townships, special districts, school systems, and other units of government nationwide. The local political landscape is very large and fragmented. Many of these governmental units are now innovating with Internet solutions to their service delivery, data management, and other problems.

Institution/Nonprofit Market Segment

The institutional sector in American society is very large and complex. It is comprised of various organizations that fall somewhere between the private sector and the government sector. This group is also a key player in the Internet industry sector. In many case, organizations in this group are both Internet service users and providers, which is certainly the case with the educational sector. The institutional/nonprofit sector is comprised of the following key subgroups:

1. Educational Institutions: Includes colleges and universities at the higher education level and K-12 school systems. These institutions will face major decisions about how they should equip themselves for the Internet industry sector, not the least of which is the future role of the Internet in educational service delivery.

2. Private Nonprofit Associations: Includes a diverse population of membership and other types of organizations that assist industries and trades, labor market groups, public interest groups, and other groups of people who see an advantage in creating and participating in representational organizations. These groups reflect the interests of their members and must be ready to provide better Internet-based services and solutions to these target populations.

3. All Other Nonprofit Organizations: This final category is very large and diverse. It includes United Way service delivery organizations, private nonprofit economic development organizations, and numerous other entities. Like organizations in the other groups, members of this one will also make greater use of the Internet in their work in the future.

Households/Consumer Market Segment

People from every socioeconomic group are making greater use of the Internet to support their activities at home, work, and for recreation. This group has been classified in various ways by Internet market researchers, including by geographic location, age, gender, income level, and educational attainment. This group is divided into five key user population groups:

Table 5: The 4x4 Market Matrix of Internet Industry Sector Relationships

Supplier Segment	Business Market Segment	Government Market Segment	Institutional Market Segment	Household Market Segment
Business Suppliers	**B2B**	**B2G**	**B2I**	**B2H**
Government Suppliers	**G2B**	**G2G**	**G2I**	**G2H**
Institutional Suppliers	**I2B**	**I2G**	**I2I**	**I2H**
Self-Employed Households	**H2B**	**H2G**	**H2I**	**H2H**

1. **Household and personal affairs management uses.**
2. **Career and employment-related uses.**
3. **Entertainment and recreational-based uses.**
4. **Educational uses.**
5. **Shopping/purchasing uses**.

Activities in these five categories are linked through the Internet, such as the increasing number of people who telecommute to work from home, or people who are enhancing their education through online training courses. Table 5 identifies the growing web of business and economic relationships and interactions that are forming via the Internet. The table identifies the increasing number of ways we will use the Internet to connect different aspects of our lives.

Thus far, the greatest attention has been given by Internet commerce companies to the Business-to-Consumer (B2C) or (B2H), and Business-to-Business (B2B) markets. In reality, the Internet industry sector includes and embraces all of the 16 economic relationships identified in Table 5. Eventually, activity will grow in all of these groupings. I should offer one point of clarification on the role of households as suppliers in this 4x4 market matrix. Households supply people or human resources to all of the core market groups through telecommuting, home-based business activities, and self-employment.

Market forecasts are revised almost monthly by commercial companies like Forrester Research, Computer Economics, and others on the growth outlook for many of these market segments. New e-commerce and e-business solutions are being discovered daily in each of these markets.

The Theory Behind The Opportunity

Northeast Ohio's future economic development strategy must identify effective ways to promote interaction among and the development of these four Internet market segments. Services offered by groups like the Cleveland Advanced Manufacturing Program (CAMP), the ECom-Ohio Project, and others will be important to this task. Most importantly, regional economic leaders should examine market-based responses to these needs that will mobilize private companies to solve these problems. This is the right strategy if regional officials want to grow the Internet industry sector in Northeast Ohio.

This strategy should focus on addressing these seven priorities:

1. Help Northeast Ohio business suppliers in restructuring vertically integrated manufacturing industries, like the auto industry, to survive the Internet technology and e-business revolutions. These companies must equip themselves with the appropriate e-business strategies to survive and thrive in the new Internet-enabled business environment.

2. Develop a strategy to facilitate regional growth in the distribution and logistics sector, which is experiencing major expansion as a result of Internet commerce growth. A major priority should be to identify the most competitive regional locations for new and expanded distribution facilities in the future.

3. Assist major Northeast Ohio service companies in information and knowledge-driven industries (quaternary sector businesses) to use e-business strategies to expand their market reach nationally and globally.

4. Develop a strategy to accommodate the future growth of the call center and back-office sector in Northeast Ohio that is expanding in response to new information technology changes.

5. Equip colleges and universities within the region with appropriate Internet-based strategies to serve the future research and development, innovation, and new product development needs of Northeast Ohio companies.

6. Expand the availability of advanced telecommunications services and new Internet services to residential areas throughout the region to promote increased telework and home-based entrepreneurship.

7. Improve the general information and communications infrastructure to support e-business development in the 16 markets identified in Table 5.

What is economic development? Economic development is defined as the process by which geographic areas and the people, businesses, and institutions physically located within these areas create jobs, wealth, and other economic resources that provide an acceptable standard of living and quality of life for area residents.[62] Evidenced by the growing number of websites, online databases, geographic information systems (GIS), and other Internet-based resources being created for and used by community, regional, and state economic development organizations, economic development will become an Internet-enabled industry, like most other industries and professions in the next couple years.

In the future, economic development in Northeast Ohio will move from its current focus on developing economic activities in geographic places to developing economic places through linkages to digital spaces.

The Internet industry sector is nothing short of a revolution.[63] Kevin Kelly, author of *New Rules for the New Economy: Ten Radical Strategies for a Connected World*, writes:

> That the principles governing the world of the soft—the world of intangibles, of media, of software, and of services—will soon command the world of the hard—the world of reality, of atoms, of objects, of steel and oil, and the hard work done by the sweat of the brow. Iron and lumber will obey the laws of software, automobiles will follow the rules of networks, smokestacks will comply with the decrees of knowledge.[64]

Kelly's analysis is especially disquieting for places like Northeast Ohio, which remain heavily glued to the "world of the hard economic activities. While Kevin Kelly makes several good points worthy of our attention, my position is that ultimately the power of the Digital Age and the Internet sector lies in the building of new connections between the "old world of the hard" and the "new emerging world of the soft." The ultimate power of the computer and the vast Internet spawned by it is "connectivity." New connections will produce both upside and down-

side effects for geographic areas like Northeast Ohio. For many businesses, institutions, and people, new connections will create new economic value. For others, tremendous economic value will be destroyed.

We turn to economic theory to understand the dynamics of economic systems. The starting point is in understanding the process of "creative destruction," which is inherent in most market-based economic systems. Creative destruction refers to the process by which old products, services, organizations, jobs, and other economic phenomena are replaced by the future generation of new ones.

Creative destruction is explained by the early economist Joseph Schumpeter's theories of entrepreneurial economy, which were based upon a disequilibrium model of the economy with two circular flows of economic activity.[65] The upper flow in Schumpeter's model consists of routine production and consumption activities within an economy. The upper flow reproduces the economy and seeks equilibrium. The lower flow in his model disrupts the upper flow through new technological innovations. These disruptions create new economic value and destroy old value. Schumpeter's chief contribution to economic development theory is the idea that economies are not static in nature and that capitalism as an economic system continuously creates new economic structures and tears down old ones that are less efficient and effective.

Schumpeter's theory of economic development provides a very useful explanation of the development of the Internet industry sector. Fueled by new information technology developments and a stock market with a voracious appetite for technology company stocks, the Internet Economy has grown rapidly in the United States and many other regions of the world. With the right competitive strategies, people and organizations in Northeast Ohio can increase their share of new business and economic opportunities created by the New Economy, even though the Internet sector's vortex rests in the Silicon Valley and other more technology-based regions.

Quite a debate exists in the "economics community" today on whether a New Economy has truly emerged, or whether we continue to operate within the boundaries of the old manufacturing-dominated economy that has led America's economic growth in the past century.[66] A recent Progressive Policy Institute analysis of states' readiness for the new technology-driven economy found that Ohio ranked 33rd among the 50 states. Ohio rated especially low on the following factors: workforce education; commercial Internet domain name registration; digital government progress; high-tech jobs; patents held; industry R&D investment; and venture capital investment.[67]

Most people, including the experts, are amazed at the strength exhibited by the national economy since 1993. Many also worry about the threat of a future economic slowdown that could diminish future business growth prospects. Chief among these worries is what happens to the stock market in the future, which has been the major growth driver since the end of the early 1990s recession.

Why has the US economy grown so rapidly since 1993? It is much more than a simple "spike" in the demand for technology-based products and services in society. While it is true that consumers want "smarter" and "higher quality" products and services, a more fundamental shift is taking place in how people and businesses are using new information technology products and services to connect, communicate, learn, experience, and transact in a global society.

The country's eight-year growth surge is part of a longer-term process of creative destruction that is giving rise to a new economic system that will steadily replace the one that took roots in Northeast Ohio and other economic regions during the late 19th century and throughout the 20th century. This logic underscores the importance of preparing Northeast Ohio for future growth in the Internet sector. We cannot afford not to get on the "new growth wagon" driven by the Internet.

It is important to understand the factors driving the growth of Internet-based products and services. Here are the seven major ones:

1. Global Connectivity: The Internet enables people and organizations to increase their connectivity worldwide through a variety of communication and information services.

2. Community Building: The Internet provides powerful tools that enable people and organizations to create their own and participate in others' vertical and online communities.

3. Faster Speed: The Internet permits the exchange and delivery of time-sensitive information and communications much faster than other modes of transfer.

4. 24-7-365: The Internet is capable of working 24 hours a day, seven days a week, and 365 days a year.

5. Cost Savings: Internet commerce (e-commerce and e-business) can produce substantial cost savings to both people and organizations. These cost savings are driving the demand for such service as online business-to-business (B2B) auctions.

6. Improved Quality: Internet-based services can help businesses achieve higher quality business results through real-time monitoring of production, service delivery, and other business functions.

7. Intelligence: For those seeking smarter products or real-time customer support, the Internet offers many advantages and services.

Given these advantages, e-business will affect economic development in Northeast Ohio in the following major ways:

1. More regional businesses will use online strategies to source and procure various strategic development resources:

    a. energy resources;
    b. financial capital;
    c. real estate (land and buildings);
    d. government service delivery; and
    e. labor and workforce resources.

2. More businesses will use e-business strategies to market themselves and develop new customers in national and global markets.

3. Geographic areas will use the Internet to market themselves to businesses for future investment opportunities.

4. Businesses will make more active use of the Internet in making future business facility location decisions.

5. Businesses will use Internet strategies to distribute and manage operations located in different geographic places.

6. Businesses will use online purchasing systems to acquire a wide variety of goods and services utilized in their business.

Northeast Ohio's Internet, Computer, Electronic, And Information Services

This section presents general estimates of the size of the computer, electronic, information, and Internet-related industries located in the 13-county Northeast Ohio region in 1999. These estimates of business establishments and employment are based upon data from the iMarket Marketplace database.[68] The iMarket database uses Dun and Bradstreet business records, which provide employment and sales data for US business establishments at the zip code and higher geographic levels. The data used in this report describe computer, electronic, information, and Internet industries at the detailed 8-digit SIC Code level. This detailed level of analysis provides an understanding of the specific products and services provided by Northeast Ohio businesses.

The estimates are much larger than the Internet industry sector, but they provide some understanding of the presence of related industries within the region. A general profile of these businesses is summarized below in Table 6. The detailed tables are found in the Appendix.

Four types of businesses are described in this profile:

- Computer and electronic equipment manufacturing;
- Computer and electronic product wholesale distribution;
- Computer, data processing, and information services; and
- Computer and electronic equipment retail sales.

The third category of businesses, computer, data processing, and information services is most closely linked to the Internet industry sector, as it contains a large number of businesses that provide Internet-related services. The companies in this category are most likely to be affiliated with the Northeast Ohio Software Association (NEOSA). These companies provide their services to consumer, business, institutional, and government markets in Northeast Ohio, nationally, and internationally. Businesses selling services to non-local markets are considered export-based companies.

The equipment manufacturing business category includes many companies that produce for the industrial electronic markets nationally and internationally. A portion of their sales may be to the regional marketplace, but it is assumed that most of their sales go to markets outside Northeast Ohio. The retail category includes businesses that sell computer-related equipment and products primarily to the Northeast Ohio household/consumer market, with some portion of their sales to the regional business, institutional, and government markets. The wholesale category includes businesses that distribute computer equipment, electronic products and devices, and related products to a variety of markets in Northeast Ohio and elsewhere.

Table 6: Thirteen-County Northeast Ohio Region Computer, Electronic, Information, and Internet-Related Business Profile [69]

1999 OVERALL SUMMARY		
Sector	Number Businesses	Number Employees
Computer, Data Processing, Electronic Information Services	**1,881**	**19,707**
Computer & Electronic Equipment Manufacturing Businesses	**184**	**9,643**
Computer & Electronic Products Wholesale Businesses	**687**	**10,102**
Computer & Related Retail Stores	**501**	**5,307**
All Sectors	3,253	44,759
1999 MAJOR INDUSTRY CONCENTRATIONS		
7371-0000, Custom programming	**181**	**835**
7371-0101, Custom software	**98**	**922**
7371-0301, Computer software	**97**	**1,535**
7372-0000, Prepackaged software	**133**	**775**
7374-0000, Data process & prep	**52**	**1,179**
7374-9902, Data process services	**52**	**3,058**
7379-0200, Computer consulting	**295**	**2,001**
3571-0000, Electronic computers	**17**	**1,836**
3571-9904, Microcomputers	**5**	**731**
3575-0100, Terminals, monitors	**4**	**914**
3672-0000, Printed circuit boards	**39**	**1,361**
5045-0000, Computers wholesale	**159**	**3,418**
5065-0000, Electronic parts, whole.	**188**	**2,294**
5734-0000, Computer & soft stores	**341**	**4,079**
5734-9901, Personal computers	**27**	**427**
Top 15 Totals	1,688	25,365

Source: iMarket Business Database, Fall 1999 data.

Internet Industry Effects On Northeast Ohio

The Internet economy represents both opportunities and threats to people, businesses, local governments, and institutions located in Northeast Ohio. With the right strategy, the new economy will represent far more opportunities than threats. In addition, the region's future economic success is predicated upon its ability to use Internet technologies and commerce to integrate "old" and "new" industries that comprise our economic base. This integration process will ensure that more local economic benefit is realized from our future investments in technology-based economic development.

What will the Internet industry sector mean to Northeast Ohio in the next decade? There are eight major ways in which the Internet will change the Northeast Ohio economy in the future. It will mean:

1. More Residents Online: A great many more Northeast Ohio residents will use the Internet as an everyday tool to help inform, plan, and manage their lives at home, work, school, and leisure.

The number of people nationwide and worldwide using computers and accessing the Internet is growing rapidly. In 1993, only 1.3 million computers were connected to the Internet on a worldwide basis. Today that number is approaching 60 million computers worldwide.[70] Presently, nearly 120 million Americans — 43 percent of the population — have access to the Internet, compared to only five million in 1993.[71] A recent analysis by Nua Internet Survey (Ireland) forecasts that the number of worldwide online users will grow to 350 million by 2005.[72]

Actual data on Internet users in Northeast Ohio does not exist at this time. However, estimates are available from several commercial and governmental surveys of the regional population. If we assume that Internet usage in Northeast Ohio is comparable to national usage (43 percent), then 1.68 million of the 13-county area's 3.9 million residents have Internet access. The University of Akron recently completed a survey of the Internet capabilities of the Ohio general population for the Ohio Supercomputer Center's new Ecom-Ohio Project.[73] That survey found that 47 percent of Northeast Ohio residents use personal computers and 41 percent of the region's population accesses and uses the Internet.

A recent private survey by Scarborough Research estimates that 37.3 percent of the Cleveland metropolitan area's adult population is online.[74] By comparison, the Scarborough survey found that the Washington, DC metro area had the highest Internet penetration with 59.9 percent of its adult population using the Internet.

Those individuals unable to access and use the Internet will be placed at very serious life and career disadvantages. This concern has been termed the "Digital Divide" by the United States Department of Commerce's National Telecommunications and Information Administration. Understandably, this should be a concern to all of us. Recent research findings by *eMarketer* indicate, however, that Internet use is less correlated to racial or ethnic background than to people's educational attainment level, income level, and age group.[75]

2. More Work From Home: Telecommuting and home-based work will follow the national trend and increase in Northeast Ohio over the next decade. According to JALA International, just over 21 million people nationally telecommute to work from home everyday. This represents about 15 percent of the current US labor force.[76] This number is expected to grow to nearly 30 million people by 2003, which would represent just over 20 percent of the projected total US labor force. Fifteen percent of Northeast Ohio's 2,008,400-labor force telecommuting would represent over 301,000 people in the region.

More workers will perform at least a portion of their job at home in the future because telecommuting provides significant advantages to both employers and employees.[77] Work schedule flexibility is just one of the key advantages offered to each group. An increasing number of professionals in business, education, health care, and other fields have home offices, which they are using more often in their jobs.

Self-employment and home-based entrepreneurship are expected to continue their significant growth in the future. The US Bureau of Labor Statistics (BLS) projects that non-agricultural self-employment will increase by 10 percent between 1998 and 2008, growing from 9,029,000 to 9,925,000 workers.[78] At present, about 6.5 percent of the US civilian labor force is self-employed. If 6.5 percent of Northeast Ohio's labor force were self-employed, that figure would represent nearly 131,000 people.

One concern is whether local and non-local telecommunications, cable television, employers, and Internet service providers (ISP) companies are equipped and ready to provide affordable high-

speed Internet access to homes across the region. Contacts with these firms and visits to their websites indicate, for example, that digital subscriber line (DSL) service is very limited in the Greater Cleveland area.[79]

3. More Business Online: Business use of the Internet nationally is growing exponentially, and it is forecast by many industry and government sources to continue its rapid growth through the next decade. Recent news stories and company reports indicate that Northeast Ohio businesses are steadily increasing their presence on the Internet.[80]

As of January 2000, the Northeast Ohio Software Association (www.neosa.com) has identified over 3,000 regional companies that are associated with the information technology (IT) industry.[81] These include a wide spectrum of companies in the communications, content, hardware, services, software, and information resources industries. A review of the *Weatherhead 100 List* provides some insight into the types of rapidly growing regional companies that are benefiting from the Internet economic growth.[82] Vantage One and Datavantage are just two of many local companies capitalizing on Internet markets.

Consumer e-commerce in the United States is expected to grow from $8 billion in 1998 to over $110 billion by 2003, which will be spent by 40 million households, according to Forrester Research.[83]

Forrester Research estimates that the US business-to-business (B2B) electronic commerce market will grow from its $48 billion level in 1998 to over $1.3 trillion by 2003.[84] International Data Corporation (IDC) forecasts that the worldwide Internet economy, which includes all consumer and business transactions on the Web, will exceed $3 trillion by 2003.

Online employment recruitment is growing nationwide as human resource professionals discover the power of the Web. A large number of Northeast Ohio companies now post available employment opportunities on their business websites. Some even use online interactive job fairs to attract the best candidates for employment.

Two examples illustrate this trend. The first one is FirstJobs.com, a new Internet website sponsored by Cleveland Live and The Plain Dealer (www.cleveland.com/firstjobs). FirstJobs is designed to help both employers and job seekers. The second is the Greater Cleveland Growth Association's Employers Resource Council (www.ercnet.org), which helps area employers in solving important human resource problems. Both initiatives are using the power of the Internet to facilitate workforce development.

Recent survey results from the ECom-Ohio Project create a less encouraging picture of Internet use by Ohio and Northeast Ohio businesses. These results were reported earlier.

4. Old and New Industries Unite: Internet commerce will benefit both old and new industries. Early perceptions of the Internet industry sector emphasized the growth of new information and knowledge-based industries over benefits available to older manufacturing, service, and retail industries. Recent mergers and business partnerships, like those by American Online and Time Warner and Ford Motor Company and Yahoo, illustrate how old and new will work together to forge the New Economy. This is an important point for Northeast Ohio, which has been working since the early 1980s to revitalize its old-line industrial base.

Internet companies, like FreeMarkets Online (www.freemarkets.com) and Vertical Net (www.verticalnet.com), are providing new competitive advantage to old-line manufacturing, service, and utility companies through online auctions and other vertical marketing services.

Retail industry giants like Wal-Mart, JC Penny, and many other companies have moved onto the Web to reinforce and strengthen their market positions nationally and globally.

Real estate developers like Trammell Crow, AMB Property, and others are benefiting from the success of web-based businesses, suggesting that the real estate industry will also benefit from Internet commerce. A recent New York Times article describes how Trammell Crow is helping to develop a Portland, OR project that will lease space to e-retailers and companies that provide warehousing and delivery services to e-retailers.

Distribution and logistic companies, like UPS, Federal Express, Airborne Express, Electron Economy, and iShip.com have experienced enormous growth from new delivery opportunities created by online purchasing by consumers and businesses.

5. More Government Service Online: Most state and local governments operate Internet websites. Reports from national professional associations like the National League of Cities and the International City/County Management Association project an in-

creased future use of the Internet as a vehicle to disseminate government information and to accomplish government business transactions. This forecast is confirmed at the local level by a recent survey of local governments in Ohio by the CSU Urban Center.[85] Innovative companies like National Information Consortium (www.nicusa.com) are accelerating government's ability to conduct business online. Many companies, including the Bank of America, Commerce One, IBM, Vertical Net, Electronic Data Systems (EDS), Scient, and others are helping governments to become more Web-based in the future.

6. More Internet-Enabled Education: Educational institutions nationwide and in Northeast Ohio are increasing their use of the Internet to support their educational programs. For example, Cuyahoga Community College (Tri-C) has launched a series of Web-based courses, cable TV courses, and distance learning educational programs. Education is predicted to become more portable and flexible in the future as the realities of life-long learning manifest themselves. As of July 1998, there were 98 elementary schools, 171 secondary schools, and 147 school districts in Ohio that had Internet web pages.[86] According to December 1999 data from the Ohio Department of Education, 92,893 of Ohio's 93,080 classrooms have been wired through the state's SchoolNet Program.[87]

7. More Institutional Business Online: A variety of public, quasi-public, and private institutions have increased their Web presence in recent years. Area colleges and universities are giving greater attention to Internet-based student services and recruiting and disseminating information online. Health care institutions are using the Internet to inform area citizens about their services. Museums, entertainment, artistic, and cultural venues are making greater use of the Internet to inform the public about their calendars, sell tickets, and provide other helpful information to customers, members, and partners.

8. Economic Development Goes Digital: The region is currently served by several highly professional public and private economic development organizations (EDOs) that are increasing their use of the Internet as a strategy for area and business development. *Marketing Communities in the Information Age*, a recent report by Donald T. Iannone and Daryl McKee for the American Economic Development Council (AEDC), projects that EDOs nationwide will make much greater use of the Internet to market their areas for new business investment.[88]

Regional Internet Development Priorities And Strategies

The Internet will change how local economic development occurs nationally and worldwide. Internet technologies and business strategies will produce changes on five inter-related levels:

1. New Development Opportunity Targets: Internet-related industries and businesses will grow in importance as future targets of opportunity for economic development. These industries are already receiving greater attention as business attraction and entrepreneurial development candidates in many metropolitan areas like the San Francisco Bay area, Pittsburgh, Baltimore, Indianapolis, Minneapolis, and Chicago.[89]

2. Online Business Purchasing and Marketing: A wide spectrum of industries are making increased use of the Internet for procurement and marketing purposes. These activities will affect regional economies as supplier centers and markets for companies worldwide. Retailers have mounted aggressive business-to-consumer (B2C) strategies., while manufacturing and service firms have expanded their business-to-business (B2B) strategies.

3. New Business Location Strategies: The Internet will change how manufacturing and service businesses approach the business facility location in the future. Many businesses have already begun using the Internet when searching for new business locations. Recent presentations and reports by corporate location experts indicate that Web-based data and information will become more important to these searches.[90]

4. New Economic Development Strategies: The Internet is changing how local, regional, and state economic development organizations market their areas for business investment, how they research business investment prospects, and how they provide economic development services to companies.[91] The use of economic development websites by communities, regions, and states has grown rapidly, and the range of information services offered to businesses by these sites also has expanded.

5. Improved Information and Communications Infrastructure: The public and private sectors must work together to ensure that the region's telecommunications and information infrastructure is capable of supporting increased e-business activity by regional companies, governments, institutions, and private citizens. Compared to many other areas, like Indianapolis, Chicago, Baltimore, Salt Lake City, Phoenix, and Atlanta, Northeast Ohio is lagging in the introduction of many advanced telecommunications and Internet-related services.[92]

Northeast Ohio officials must be prepared to respond to each of these five developments in the near future.

Internet Economy Development Targets

Two categories of industries and businesses should be viewed as priority development targets in the future:

Two categories of industries and businesses should be viewed as priority development targets in the future:

1. Internet industry sector businesses, which fall into four groups:

- Infrastructure layer firms
- Applications layer firms
- Intermediary layer firms
- Commerce layer firms

2. Quaternary sector businesses, or information and knowledge-intensive industries, which will depend heavily upon the Internet to meet their information and knowledge needs. Key industry and business operation targets include:

- Finance, insurance, and real estate (FIRE).
- Advanced business services (accounting, law, management consulting).
- Engineering and design services (electrical, electronic, computer, chemical, mechanical, civil, environ mental, manufacturing, industrial,ar chitectural design).
- Computer programming and informa tion management services.
- Back-office, order fulfillment, telemarketing centers.
- Corporate headquarters and corpo rate office facilities.
- Distribution and logistics sector.
- Travel and tourism sector.

Online Business Purchasing and Marketing

The Internet is changing how businesses buy and sell a wide range of products and services. Internet startups like Priceline.com, VerticalNet, FreeMarkets Online, and other companies have emerged in response to this growing need. In addition, most established manufacturing and service businesses are currently evaluating how the Internet can help them to serve or access business and consumer marketplaces. Northeast Ohio's future economic development strategy must give adequate recognition to these developments by:

1. Smaller Company Assistance: Educating and assisting small and medium-sized manufacturing and service businesses to adopt and use these business strategies in the future.

2. Global Market Knowledge: Creating a greater awareness by local companies of global market opportunities that can be served or supported by e-business strategies. Many smaller firms need to strengthen their understanding of international business opportunities.

3. E-Business Solutions for Vertical Industries:[93] Assisting smaller suppliers to large, vertically integrated industries, e.g., the automotive industry, to compete in the new Internet business environment that will be dominated by online auctions, Internet purchasing hubs, and other e-business strategies. Many of these firms could lose out without this special assistance.

4. E-Cluster Hubs: Regional industry business hubs, or "e-cluster hubs," should be evaluated for the following industry clusters: metalworking; software and information services; medical and health care; travel and tourism; financial services and insurance; real estate; transportation and distribution; precision product manufacturing networks; advanced engineering materials; and governmental services.

The "e-cluster hub" concept involves the strategic linking of purchasing and marketing websites and other e-business strategies used by companies in the same industry cluster. The goal of an e-cluster hub is to increase the buying power and/or marketing strength of businesses affiliated with a given industry cluster.

Internet-Enabled Business Location Strategies

Companies are making greater use of the Web in undertaking facility location studies. Economic development organizations are placing more site selection data on Internet websites, and companies searching for new locations are using Intranets and Extranets to facilitate their business location projects.[94] The Internet will eventually make these location studies more efficient by allowing electronic information and data to be applied quickly to site selection decisions. This means that economic development organizations must be prepared to respond to these requests in short time frames. Integrated electronic economic development databases, supported by geographic information systems (GIS), are developing in many regions across the nation. Many states are also moving in this direction.[95]

Northeast Ohio's leading economic development organizations should assess the benefits of the following Internet-based strategies to compete in the future business location market:

1. E-Business Success Database: Assist Northeast Ohio companies in creating an online database that provides information about how the region's manufacturing and service sectors have used technological innovation to gain a competitive edge in today's global marketplace. The hub could be organized around two main components. The first is a publicly accessible component that allows anyone to access general summary information about regional business progress in global markets. The second would be accessible to private and institutional members and provide benchmarking information on business success strategies.

2. Regional Marketing Site: Create one integrated regional economic development marketing website to communicate the region's overall advantages for business investment and growth. This site should link to other regional marketing strategies andt should work to build a "unified regional economic identity" for the region nationally and globally. This mega-marketing site should provide links to the various economic development organizations serving the region.

3. Regional Economic Development Database: Create an online database that can be shared and used by regional and local economic development organizations in preparing customized business location and investment proposals. The site should

be accessible to business investment prospects once they have established a working relationship with area economic development groups.

Online Workforce Hub

Regional officials should examine the merits of creating a new Internet-based workforce information and service called the Net-Work Hub. The Center should be organized with three components:

1. Industry Cluster Work Innovation Centers to provide labor market information services and promotes workplace innovations by employers within the identified industry clusters that the region is promoting for economic development. The Metalworking or Motor Vehicle industry clusters are logical candidates to start with. The goal of each Work Innovation Center would be to respond to major workforce priorities faced by employers within an identified industry cluster.

2. Flex-Work Center to promote the exchange of information among Northeast Ohio employers and workers interested in contract and temporary employment assignments. The goal of the Flex-Work Center would be to increase the flexibility and mobility of the region's workforce in responding to new labor market needs.

3. Talent Marketing Center to work with private employment agencies, executive, and technical recruiting firms, and private employers to attract highly skilled and technically trained people to Northeast Ohio region. This talent marketing initiative should build upon existing models being used by the Pittsburgh Regional Alliance, the Michigan Economic Development Corporation, and other economic development organizations.

Economic Development Research Strategies

The Web is changing how geographic places provide economic development services on all levels. Northeast Ohio will need greater knowledge advantages to compete in the fast -changing global marketplace. Northeast Ohio economic development officials should assess the value of two knowledge strategies in contributing to future regional economic development success:

1. Online Economic & Fiscal Analysis Tools: Develop online analytic models that provide economic and fiscal impact analysis and project financial analysis to public and private sector economic development organizations. The first set of research tools would help officials estimate the regional economic and fiscal impact of proposed major economic development projects. The second would help regional economic leaders prepare online financial analysis of major development projects. These two database-driven tools would help regional officials decide which actions, such as public incentive investments, are required to produce more successful economic development outcomes. While neither tool can provide perfect answers to development decisions, each can help inform regional decision-making.

2. Regional Business Database: Create an electronic regional business database to support economic development, business, and market research projects undertaken by area economic development organizations, governmental entities, and private companies. Better knowledge of regional business characteristics can help in designing more targeted and effective economic development services. The database should be updated annually through a regional business survey. A user-friendly GIS mapping capability should be considered in conjunction with the dynamic database. This knowledge tool will help future work with regional industry clusters, workforce development, technology transfer, and other economic development projects. Available commercial business databases should be assessed in terms of their suitability in serving as a foundation for this ongoing database.

Regional Internet Infrastructure Development

Infrastructure improvements will be needed to support future Internet business growth in Northeast Ohio. Hopefully competition among private telecommunications and Internet access providers will grow, resulting in lower prices and expanded product and service choice for regional businesses and residential consumers.

1. Market-Based Internet Infrastructure Solutions: The first step is for area economic leaders to request proposals from major regional, national, and international companies that can meet the future Internet infrastructure, intermediary, and applications needs of regional businesses and other groups. While the market will pay the strongest role in deciding which services are bought, it is vitally important that we educate these suppliers at all levels about current and future needs in Northeast Ohio.

2. Coordinated Public Sector Internet Investments: Public sector investments in the region's Internet infrastructure should be coordinated across political jurisdictions to ensure that an integrated regional information and communications system emerges. A fragmented telecommunications, cable, and Internet infrastructure could inhibit future regional economic growth in quaternary sector (information and knowledge-intensive) industries. Better joint planning can help to create a more integrated infrastructure to support future growth.

Regional Market Power-Building Strategies

In the past, economic development has emphasized employment, wealth, and business growth and development. The "Jobs Mantra" has been the most compelling justification for economic development nationally and worldwide. Employment concerns will remain important in the future, but the "market action" role of economic development organizations (EDOs) will become more important in coming years.

Economic development organizations should help geographic areas use their "market power" to retain, develop, and attract new economic opportunities. Internet strategies can help increase the region's future market strength. The market power of 3.9 million people and 110,000 businesses is very significant. This market strength should be used to stimulate new business development and institutional innovation within the region. Market action strategies should be investigated to help respond to the following three economic development challenges:

1. Better Internet Infrastructure Services: Improving the responsiveness of telecommunications and Internet infrastructure companies to provide higher quality communications and information services to regional businesses and homes.

2. Increased Information Industry Entrepreneurship and Self-Employment: Regional residents should be challenged to create more Information Technology (IT) and Information Intensive (II) businesses within the region.

3. Flexible, Portable, and Customized Education: Regional school districts, colleges, and universities should be challenged by area employers and residents to provide more innovative and flexible educational services.

Conclusion

The Internet industry sector will have a major impact on regional economies across America in the next decade. While the Internet is no panacea for our vast and complex regional economic challenges, Northeast Ohio leaders and the general public should give much greater recognition to the importance of this sector as a catalyst for future economic development. Presently Northeast Ohio leaders and residents are not thinking about the issue in a comprehensive and systematic way.

The Internet will produce both opportunities and threats for Northeast Ohio communities, businesses, institutions, and residents. The region's economic leaders and residents must build effective strategies to cope with possible threats and develop new business and economic opportunities.

A potential leading threat is how online auctions and other Internet transactions might affect the availability of future business opportunities for existing industrial companies within the region. The answer is that these companies must get prepared to conduct business on the Web if they are to survive and hopefully thrive. All types of local businesses must be working in this direction, including small "Mom and Pop" retailers and large multinational industrial giants.

A potential leading opportunity is to create the next generation of software, multi-media, information service, and Web-ready general industry within the region. The answer in this case is to increase the number of Internet startups within the region and to help existing service and manufacturing companies to expand their use of Internet strategies in doing business.

This monograph's recommendations describe a range of strategies that can help with both threats and opportunities. These include:

1. Developing our regional capacity to facilitate economic development in the new online environment. A top priority should be to use Internet technologies and business strategies to strengthen the "value chains" of our leading industry sectors and clusters.

2. Helping smaller companies to adopt new Internet technologies that can increase their global competitiveness. These firms must be prepared to compete in the growing global marketplace.

3. Taking steps to increase the region's telecommunications and information service infrastructure capacity to support future e-business by companies, local government, public and private institutions, and private citizens.

4. Using our regional consumer and business market strength to bolster the region's Internet infrastructure and services. At present, these services are lagging other areas. Nor are current services challenging business and consumer users to increase their use of Internet technologies.

5. Creating new research or "knowledge tools" to support regional economic development in a more information-rich business and economic environment.

While it is unrealistic to think that Northeast Ohio will become another Silicon Valley, many worthwhile local opportunities exist to put Internet technologies and business strategies to work in creating new economic value for the region. Internet use by all groups in society is growing rapidly. Even the most conservative estimates foresee the Internet becoming a ubiquitous part of most aspects of our home and work lives. Regional leaders and residents must define how these technologies will be used to promote future economic growth. The region needs to be more proactive in dealing with these technological and economic issues. If we wait, outside economic interests could claim a greater share of future economic benefits from the Northeast Ohio marketplace.

Monograph Endnotes

[1] Analysis based upon employment and real value-added economic output forecasts prepared by Regional Financial Associates (RFA) for this project.

[2] The ECom-Ohio Project, under the Ohio Supercomputer Center, has published recent reports on citizen and business use of the Internet, which reflect that Ohio is about average in this regard.

[3] Yoneji Masuda, *The Information Society as Post-Industrial Society*, World Future Society, Washington, DC, 1980

[4] Fritjoj Capra, *The Web of Life: A Scientific Understanding of Living Systems*, Anchor Books, NY, 1996.

[5] Yoneji Masuda, *The Information Society as Post-Industrial Society*, World Future Society, Washington, DC, 1980.

[6] *The Trillion Dollar Race to "E"*, by Charles E. Lucier and Janet D. Torsilieri, *Strategy&Business*, Issue 18, First Quarter, 2000.

[7] *"Carmakers to Buy Parts on Internet,"* Keith Bradsher, New York Times, Page 1, February 26, 2000.

[8] See *An Assessment of Costs, Benefits, and Impacts of Ohio's Economic Development Programs: A Final Report to the State of Ohio*, Donald T. Iannone, principal author, May 1999.

[9] *Cleveland's Emerging Economy: A Framework for Investing in Education, Science, and Technology*, Michael Fogarty, Center for Regional Economic Issues, Case Western Reserve University. September 1, 1998.

[10] *See Location, Competition, and Economic Development: Local Clusters in a Global Economy*, by Michael E. Porter, in *Economic Development Quarterly*, Volume 14, Number 1; February 2000.

[11] See the industry cluster article series in the February 2000 issue of *Economic Development Quarterly* by Ned Hill, John Brennan, Ziona Austrian, and Jocelyn Fagan.

[12] See *Cluster Case Studies: The Marriage of Quantitative and Qualitative Information for Action*, by Ziona Austrian, *Economic Development Quarterly*, Volume 14, No. 1, February 2000.

[13] See *At Graduate Schools, a Great Divide Over E-Business Studies*, by David Leonhardt, *New York Times*, January 16, 2000, page B7.

[14] *Beyond the Information Revolution*, by Peter Drucker, *The Atlantic Monthly*, October 1999.

[15] *"Getting IT Done,"* by Michael Zawacki, *Inside Business*, March 2000.

[16] ISDN = Integrated services digital network; which is installed as a separate line to provide Internet connection speeds of approximately 128 kbps; DSL = Digital subscriber line; which digitizes data and transmits it over standard copper phone wires at speeds ranging from 144 kbps to 1 mbps; T-1technology is a separate line that enables connection speeds up to 1.5 mbps; and fiber optic cable enables connection speeds of up to 10 mbps.

[17] The Internet can be accessed by anyone with a dial-up or LAN connection. It has unlimited public access, and a wide range of information is found on the Internet. An Intranet is a computer network or website that is accessible to only employees within a given organization, or other authorized external users. Intranets tend to offer very specialized information that is often proprietary in nature. An Extranet is a network or website that has limited access by collaborating organizations. Access is limited to external partners or customers, and the information found on an Extranet is often shared data used to facilitate inter-organizational work processes.

[18] The ECom-Ohio Project, under the Ohio Supercomputer Center, has published recent reports on citizen and business use of the Internet, which reflect that Ohio is about average in this regard. Other studies by commercial companies like Forrester Research, and others lead to the same general conclusion.

[19] The ECom-Ohio Project is currently investigating these concerns and issues.

[20] See *Falling Through the Digital Divide*, National Telecommunications and Information Administration, United States Department of Commerce, Washington, DC, July 1999.

[21] Contacts were made with several state public utility commissions to identify how telecommunications suppliers were serving different state-defined markets. While SBC/Ameritech remains the largest service provider in the urban areas in the 6-state Great Lakes region, as many as 100 smaller telephone companies are involved in serving the rural parts of many these states.

[22] Sources: The Internet Society website at: www.isos.org and Ohio SuperComputer Center at: www.osc.edu

[23] A large number of state and local economic development organizations are using the Internet to offer infor-

mation and other services to business and community clients. See *Marketing Communities in the Information Age*, by Donald T. Iannone and Daryl F. McKee, 1998. This monograph was prepared for the American Economic Development Council (AEDC) for distribution to its 2,500 members and other audiences nationwide.

[24] Interviews conducted with various Internet companies.

[25] These technical terms refer to the portions of Internet space utilized to perform these different functions. Email systems use Simple Mail Transfer Protocol (SMTP), which is a standardized way of transferring email files between host computers. File Transfer Protocol (FTP) is a procedure for uploading and downloading files between host computers. Gopher is a protocol for distributed document search and retrieval on the Internet. Finger is a protocol used to make queries or searches on the Internet. New search engines have replaced the need for the Finger protocol for most people.

[26] Source: Reported by Nua Surveys, Ireland, February, 2000.

[27] See http://thelist.internet.com/ for future updates.

[28] Internet.com Internet Service Provider List.

[29] Source: Media Metrix' website at www.mediametrix.com

[30] The term "attention economy" is used by Joe Pine and Jim Gilmore in their new book the *Experience Economy*. With the growth in Internet advertising and websites, competition for customers' attention is paramount.

[31] The Internet is used for different purposes and as a result is comprised of distinct user spaces. The World Wide Web is the graphical interface of the Internet, which is the largest user space on the Internet. Gopher and Finger space are older search engine spaces that are used less today as Web-based search engines emerge. FTP (File Transfer Protocol) space is area used to transfer large files quickly using the FTP procedure. Email space is growing rapidly, but especially Web-based email, which will eventually become larger than the older email space.

[33] See *Cash-Free Economy*, by Susan Moran, *Business 2.0*, February 2000.

[32] Map produced by John December, located at http://www.cybergeography.org

[34] *Growth and the Internet: Surfing to Prosperity?* By David Altig and Peter Rupert, Federal Reserve Bank of Cleveland's *Economic Commentary*, September 1, 1999.

[35] US Census Bureau, Current Population Estimates for 1998, July 1999.

[36] US Bureau of Economic Analysis, BEA Estimates of Local Area Income, 1999.

[37] Population estimates for 1998

[38] Total personal income estimates in current dollars for 1997.

[39] Consists of Cuyahoga, Lake, Geauga, Medina, Lorain, and Ashtabula Counties.

[40] Consists of Summit and Portage Counties.

[41] Consists of Stark and Carroll Counties.

[42] Consists of Mahoning, Trumbull, and Columbiana Counties.

[43] 1998 data from Standard & Poors/DRI, *US Metropolitan Economies: Engines of American Growth*, 1999.

[44] 1998 data from Standard & Poors/DRI, *US Metropolitan Economies: Engines of American Growth*, 1999.

[45] Regional Financial Associates (RFA), forecasts prepared for this study, 1999.

[46] Regional Financial Associates (RFA), forecasts prepared for this study, 1999.

[47] This principle is integral to economic base theory, which posits that local economies grow by exporting their products and services to outside markets and in return bring new income into the regional economy.

[48] The economic principle of trade is based upon the concept that nations, other geographic-based economies, and industries will exchange goods and services on the basis of their comparative advantage(s).

[49] Milken Institute, America's High-Tech Economy: Growth, Development, and Risks for Metropolitan Areas, Final Report, July 13, 1999.

[50] Alan Achkar and Zach Schiller, *Comeback City? Positioning Cleveland for the New Economy*, Cleveland Plain Dealer, January 16, 2000, page 1.

[51] Identified through a review of earlier studies by the Center for Regional Economic Issues (REI) at Case Western Reserve University, Cleveland Tomorrow, the Greater Cleveland Growth Association, and other groups.

[52] Ziona Austrian, John Blair, Adina Wolf, and John Zipp, Ohio Employment Trends: Historical Perspectives and Projections, CSU Urban Center Working Paper, Summer 1999.

[53] Ziona Austrian, John Blair, Adina Wolf, and John Zipp, Ohio Employment Trends: Historical Perspectives and Projections, CSU Urban Center Working Paper, Summer 1999.

[54] Milken Institute, America's High-Tech Economy: Growth, Development, and Risks for Metropolitan Areas, July 13, 1999.

[55] A number of newspaper stories and professional journal articles report situations where people are spending an excessive amount of time connected to the Internet. Online help groups, therapy centers, and other resources have been created to help people who need help with cyber-dependence.

[56] B. Joseph Pine II and James H. Gilmore, *The Experience Economy: Work Is Theatre and Every Business A Stage,* Harvard Business School Press, 1999.

[57] See *Measuring the Digital Economy* by John Haltiwanger and Ron Jarmin, US Census Bureau, unpublished working paper, July 1999., and Measuring the Internet Economy: An Exploratory Study, unpublished working paper, Center for Research in Electronic Commerce, Graduate School of Business, The University of Texas at Austin, June 10, 1999.

[58] See ECom-Ohio at: http://www.osc.edu/ecom-ohio/ for copies of the Ohio Citizens Online and Ohio Business Online survey results.

[59] As reported by Computer Economics website: www.computereconomics.com

[60] As reported by The Standard's website at: www.thestandard.com in its lead story on February 4,2000.

[61] Center for Research in Electronic Commerce, The University of Texas at Austin, *Measuring the Internet Economy.* Working paper, June 10, 1999.

[62] This definition draws upon several earlier ones developed by the American Economic Development Council, the Council for Urban Economic Development, various academic researchers, and working professionals in the economic development field.

[63] This observation is supported by an analysis of the growing academic, professional, and popular literature on how the Internet is changing our lives and our work.

[64] Kevin Kelly, *New Rules for the New Economy: Ten Radical Strategies for a Connected World,* Penguin Books, 1998.

[65] Joseph Schumpeter, *The Theory of Economic Development,* Harvard University Press, Cambridge, MA, 1934.

[66] For some pertinent references, see *How Real is the New Economy?* in The Economist, July 24-31, 1999, and *The New Economy,* in Business Week, January 31, 2000.

[67] *The State New Economy Index: Benchmarking Economic Transformation in the States,* The Progressive Policy Institute, Washington, DC, July 1999.

[68] Source: iMarket Marketplace Database, December 1999.

[69] Includes related businesses in four NE Ohio metro areas: Cleveland-Lorain, Akron, Canton, and Youngstown.

[70] Internet Software Consortium, Internet Domain Survey, July 1999. For reference, see: www.isc.org

[71] Nielson NetRatings Service, December 1999 Survey.

[72] Nua Ltd., Nua Internet Surveys, Dublin, Ireland.

[73] Institute for Public Policy, University of Akron, *Internet Capabilities of the General Public in Ohio,* January 2000.

[74] Scarborough Research, Top US Market Internet Penetration Survey, 1999.

[75] National Telecommunications and Information Administration, US Department of Commerce, *Falling Through the Net: Defining the Digital Divide,* July 1999.

[76] See eMarketer Online at www.emarketer.com.

[77] Charles Grantham, *The Future of Work: The Promise of the Digital Work Society,* McGraw Hill, 2000.

[78] US Bureau of Labor Statistics, *Employment Projections, 1998-2008.*

[79] Readers can use the following Internet website to determine what type of DSL service is available at their home or business address: http://www.dslreports.com

[80] Northeast Ohio Software Association, Greater Cleveland Growth Association interviews.

[81] Interview with James Cookinham, NEOSA, January 21, 2000.

[82] Case Western Reserve University Weatherhead School of Management, 1999 Weatherhead 100 List.

[83] Forrester Research, US Internet Commerce Forecast, 1999 at www.forrester.com

[84] Forrester Research, US Internet Commerce Forecast, 1999 at www.forrester.com

[85] Cleveland State University Urban Center

[86] Web66: International Scool Website Registry, January 1999. (http://web66.umn.edu/schools.html)

[87] Ohio Department of Education, SchoolNet statistics found at: www.ohioschoolnet.k12.oh.us

[88] Donald T. Iannone & Daryl McKee, *Marketing Communities in the Information Age*, American Economic Development Council, Chicago, IL, 1998.

[89] These metro areas were identified from a review of economic development websites and the practitioner literature.

[90] Sources: Interviews with site selection professionals, and review of various site selection magazines such as Expansion Management, Business Facilities, and Site Selection Magazine.

[91]Source: *Marketing Communities in the Information Age*, by Donald T. Iannone & Daryl F. McKee, American Economic Development Council publication, Chicago, IL., 1998.

[92] Based upon selected interviews and website analyses conducted.

[93] Vertical industries are those that exhibit a high level of vertical integration in their organization. The automotive industry is a highly vertically integrated industry.

[94]Source: *Marketing Communities in the Information Age*, by Donald T. Iannone & Daryl F. McKee, American Economic Development Council publication, Chicago, IL., 1998.

[95] Examples include the Greater Phoenix Economic Council, the Arizona Department of Commerce, Iowa's Smart State for Business Program, the Nebraska Department of Economic Development, Bay Area Council, and others.

Appendix Tables

Table A-1: Northeast Ohio Services: Computer, Data Processing, & Electronic Information

	NE Ohio Services: Computer, Data Processing, and Electronic Information		
8D SIC Code	Industry Description	Businesses	Employees
7299-0604	Information services, consumer	12	74
7299-9903	Computer photography or portrait	9	42
7371-0000	Custom computer programming services	181	835
7371-0100	Custom computer programming services	27	301
7371-0101	Computer software systems analysis and design, custom	98	922
7371-0200	Computer software writing services	8	37
7371-0202	Computer software writers, freelance	3	4
7371-0300	Computer software development and applications	31	189
7371-0301	Computer software development	97	1,535
7371-0302	Software programming applications	4	26
7372-0000	Prepackaged software	133	775
7372-9901	Application computer software	7	81
7372-9902	Business oriented computer software	11	222
7372-9903	Educational computer software	3	13
7372-9904	Home entertainment computer software	1	1
7372-9905	Operating systems computer software	4	205
7372-9906	Publisher's computer software	3	7
7372-9907	Utility computer software	1	1
7372-9908	Word processing computer software	1	25
7373-0000	Computer integrated systems design	104	797
7373-0100	Systems software development services	24	304
7373-0101	Computer systems analysis and design	12	409
7373-0102	Systems engineering, computer related	3	21
7373-0200	Systems integration services	32	307
7373-0201	Local area network (LAN) systems integrator	8	53
7373-0202	Office computer automation systems integration	1	3
7373-0300	Computer system selling services	4	25
7373-0301	Turnkey vendors, computer systems	4	82
7373-0302	Value-added resellers, computer systems	28	223
7373-0400	Computer-aided system services	2	18
7373-0401	Computer-aided design (CAD) systems service	8	90
7373-0402	Computer-aided engineering (CAE) systems service	1	6
7374-0000	Data processing and preparation	52	1,179
7374-0100	Computer processing services	11	264
7374-0101	Calculating service (computer)	1	5
7374-0102	Computer graphics service	61	309
7374-0103	Computer time-sharing	3	18
7374-0104	Service bureau, computer	3	8
7374-9901	Data entry service	9	368
7374-9902	Data processing service	52	3,058
7374-9905	Optical scanning data service	1	5
7374-9906	Tabulating service	2	35
7375-0000	Information retrieval services	33	322
7375-9901	Data base information retrieval	7	310
7375-9902	On-line data base information retrieval	8	61
7375-9903	Remote data base information retrieval	1	3
7376-0000	Computer facilities management	6	329
7377-0000	Computer rental and leasing	21	152
7377-9901	Computer hardware rental or leasing, except finance leasing	2	4
7377-9902	Computer peripheral equipment rental and leasing	1	3
7378-0000	Computer maintenance and repair	131	841
7378-9901	Computer and data processing equipment repair/maintenanc	11	245
7378-9902	Computer peripheral equipment repair and maintenance	9	87
7379-0000	Computer related services, nec	37	97
7379-0100	Computer related maintenance services	30	265
7379-0200	Computer related consulting services	295	2,001
7379-0201	Computer hardware requirements analysis	6	25
7379-0202	Data processing consultant	35	319
8243-0000	Data processing schools	14	79
8243-9901	Operator training, computer	11	107
8243-9902	Repair training, computer	1	3
8243-9903	Software training, computer	15	116
8711-9905	Electrical or electronic engineering	53	397
8731-0203	Computer (hardware) development	4	13
8731-9901	Electronic research	6	104
8742-9905	Management information systems consultant	12	113
8748-0400	Systems analysis and engineering consulting services	19	186
8748-0401	Systems analysis or design	8	124
8748-0402	Systems engineering consultant, ex. computer or professiona	24	383
8999-1002	Information bureau	3	25
1731-0102	Computer power conditioning	1	2
1731-9902	Computer installation	17	109
Services Totals:		1,881	19,707

TABLE A-2: NORTHEAST OHIO COMPUTER & ELECTRONIC EQUIPMENT AND PRODUCT MANUFACTURING

NE Ohio Computer & Electronic Equipment Manufacturing			
8D SIC Code	**Industry Description**	**Businesses**	**Employees**
3571-0000	Electronic computers	17	1,836
3571-9901	Computers, digital, analog or hybrid	3	5
3571-9903	Minicomputers	2	N/A
3571-9904	Personal computers (microcomputers)	5	731
3572-0000	Computer storage devices	5	78
3572-0100	Computer disk and drum drives and components	1	N/A
3572-9902	Magnetic storage devices, computer	1	11
3575-0000	Computer terminals	3	21
3575-0100	Computer terminals, monitors and components	4	914
3577-0000	Computer peripheral equipment, nec	17	451
3577-0102	Printers, computer	1	7
3577-9907	Input/output equipment, computer	3	9
3672-0000	Printed circuit boards	39	1,361
3672-9901	Circuit boards, television and radio printed	1	7
3674-0000	Semiconductors and related devices	4	305
3674-0200	Integrated circuits, semiconductor networks, etc.	3	3
3674-0207	Microprocessors	1	170
3674-9905	Modules, solid state	1	130
3678-0000	Electronic connectors	5	304
3679-0000	Electronic components, nec	5	5
3679-0100	Electronic circuits	20	798
3679-0108	Rectifiers, electronic	1	32
3679-0111	Transducers, electrical	1	12
3679-0400	Electronic crystals	1	180
3679-0403	Quartz crystals, for electronic application	4	195
3679-0500	Electronic switches	4	267
3679-9901	Antennas, receiving	2	370
3679-9902	Antennas, satellite: household use	1	1
3679-9905	Harness assemblies, for electronic use: wire or cable	17	1,193
3679-9908	Liquid crystal displays (LCD)	3	210
3695-0101	Computer software tape and disks: blank, rigid, and floppy	5	16
3699-0300	Electronic training devices	1	5
3944-0200	Electronic games and toys	2	5
3944-0201	Electronic game machines, except coin-operated	1	11
Manufacturing Totals		184	9,643

Table A-3: Northeast Ohio Wholesale Distribution: Computer & Information Products

NE Ohio Wholesale Distribution: Computer and Information Related Products			
8D SIC Code	Industry Description	Businesses	Employees
5045-0000	Computers, peripherals, and software	159	3,418
5045-0100	Computer peripheral equipment	32	331
5045-0102	Keying equipment	2	5
5045-0103	Printers, computer	1	12
5045-0104	Terminals, computer	4	82
5045-9903	Computer software	66	819
5045-9904	Computers and accessories, personal and home entertainment	9	54
5045-9905	Computers, nec	59	920
5045-9906	Mainframe computers	4	23
5045-9907	Word processing equipment	2	203
5065-0000	Electronic parts and equipment, nec	188	2,294
5065-0100	Telephone and telegraphic equipment	8	82
5065-0103	Telephone equipment	30	751
5065-0204	Intercommunication equipment, electronic	7	16
5065-0205	Modems, computer	2	11
5065-0208	Sound equipment, electronic	16	278
5065-0300	Electronic parts	62	567
5065-0301	Capacitors, electronic	1	25
5065-0303	Coils, electronic	4	12
5065-0305	Connectors, electronic	1	5
5065-0306	Diodes	1	2
5065-0309	Semiconductor devices	9	61
5065-0310	Transformers, electronic	2	12
5065-9901	Diskettes, computer	1	1
5112-0400	Computer and photocopying supplies	13	108
5112-0401	Computer paper	3	6
5112-0402	Data processing supplies	1	4
Wholesale Distribution Totals:		687	10,102

TABLE A-4: NORTHEAST OHIO RETAIL OPERATIONS: COMPUTER AND INTERNET RELATED PRODUCTS

NE Ohio Retail Operations: Computer and Internet Related Products			
8D SIC Code	**Industry Description**	**Businesses**	**Employees**
5734-0000	Computer and software stores	341	4,079
5734-0100	Computer peripheral equipment	48	291
5734-0101	Modems, monitors, terminals, and disk drives: computer	10	40
5734-0102	Printers and plotters: computers	5	13
5734-0200	Computer software and accessories	31	112
5734-0202	Magnetic disks	1	1
5734-0203	Software, business and non-game	18	52
5734-0204	Software, computer games	6	29
5734-0205	Word processing equipment and supplies	3	38
5734-9901	Personal computers	27	427
5961-0200	Computer equipment and electronics, mail order	6	150
5961-0201	Computer software, mail order	1	2
5961-0202	Computers and peripheral equipment, mail order	4	73
Retail Totals		501	5,307

The Northeast Ohio Research Consortium was formed in 1979 to provide research and analysis and to facilitate regional networking among institutions and organizations. The Consortium's World Class Region Initiative explores the critical path to global economic competitiveness. Its research seeks to catalyze effective regional responses by identifying the region's industry clusters and drivers, benchmarking the region's emerging workforce needs, and anticipating economic challenges. For more information call (216) 687-2134.

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