# Great Valley — Pennsylvania's I-81 Technology Corridor: Growing a 21st Century Knowledge Economy In Lackawanna and Luzerne Counties

Prepared for
Greater Scranton Chamber of Commerce and
Greater Wilkes-Barre Chamber of Business and Industry

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# Preface

This report presents a strategy for developing a knowledge-based economy centered on the communities of Scranton and Wilkes-Barre, Pennsylvania. This region, which includes Lackawanna and Luzerne Counties and the cities of Scranton, Wilkes-Barre, and Hazleton, is referred to as "Great Valley" reflecting the region's distinct geography and important place in the nation's history. The Greater Scranton Chamber of Commerce and the Greater Wilkes-Barre Chamber of Business and Industry sponsored the development of the strategy. The project received financial support from the Lackawanna and Luzerne County Boards of Commissioners; the Commonwealth of Pennsylvania, through its Department of Community and Economic Development (DCED); and the federal government, through the U.S. Department of Commerce's Economic Development Administration (EDA).

Battelle Memorial Institute's Technology Partnership Practice was selected to assist in preparing the strategy. The project team included Dr. Walter Plosila and Ms. Marianne Clarke of Battelle, and two distinguished academic scholars, Dr. Richard Florida, H. John Heinz III Professor of Regional Economic Development in the John Heinz III School of Public Policy and Management at Carnegie Mellon University, Pittsburgh, Pennsylvania, and Dr. Edward Feser, Assistant Professor of City and Regional Planning, at the University of North Carolina-Chapel Hill. Professor Feser conducted an economic analysis of the Great Valley economy. His findings contributed to the development of the strategy and are summarized throughout the report. A complete copy of his report, *Regional Growth and Industry Clusters in the Scranton-Wilkes-Barre-Hazleton MSA*, is available from the sponsors of the study.

The Battelle team would like to thank the many individuals who shared their experiences and knowledge of the region and its economy with the project team by participating in interviews and attending focus group meetings. Numerous individuals provided valuable insight and assistance in the preparation of the strategy. Appendix A contains a list of the people who participated and contributed to the development of the report

Special thanks are due to Austin Burke and Kristine French of the Greater Scranton Chamber of Commerce and Steve Barrouk, Todd Vonderheid, and John Augustine of the Greater Wilkes-Barre Chamber of Business and Industry, who assisted in conceptualizing, developing and guiding the project. Thanks are also due to the members of the Steering Committee that oversaw the development of the strategy, including William W. Scranton, III, who served as Chair.

# Executive Summary

## Introduction

The Great Valley Region – Lackawanna and Luzerne Counties, Pennsylvania -- thrived as a center of the industrial revolution, helping lead the country from an agrarian economy to an industrial economy that was the envy of developed countries around the world. The natural resource base — coal — and the transportation infrastructure — waterways and rail lines in proximity to manufacturing plants — enabled the region to contribute significantly to the nation's growth and development. As evidence of its strength and importance, Great Valley became the third largest population center in the Commonwealth of Pennsylvania.

But, in the past 70 years the region's comparative advantage in natural resources, particularly coal, has eroded. During the post-war years, the region embarked on a second wave of industrial development based on the apparel industry. However, due to international competition and technological obsolescence, the needle trades are also fading. As a result, jobs and orders for goods shifted, first to other parts of the country, and eventually overseas.

Today the region is enjoying some benefits from a third wave of economic development. Having successfully diversified its economic base in the period since World War II, the region now ranks among the top ten centers in the U.S. in information processing. It has become a preferred location for call centers, warehousing, and distribution. The manufacturing firms in the region engage in a wide range of activities, from advanced technology (semiconductors, electronics, instruments, plastics, and glass) to mature technology (printing and publishing, metalworking, and paper). Retail services now represent a significant portion of the economic base. Diversification has been key to the successful repositioning of the economy of Great Valley.

In the post-World War II period, Great Valley has been able to market itself as a low cost place to do business. Even today, low labor costs, a productive workforce, and competitive financing of land, buildings, and equipment enable Great Valley to be competitive with other low cost metropolitan areas such as Jacksonville and Tampa, Florida. However, the region appears to face a dilemma: technology is driving the world economy in ways that remove the advantage that came from being the lowest cost place to do business. In terms of competitive advantage -- the capacity to generate knowledge, to innovate, the quality of the workforce and the ability to retain and attract talent -- are becoming more important for expansion of the existing business base and for new business locations.

Economic developers must ensure that the region has the basis to compete. This study was designed to assist the region in answering the basic question: Does Great Valley continue to implement its broad not-targeted diversification approach, or does the region identify its assets – knowledge, technology, talent -- and build on them to expand into the new technology-driven economy?

# Dimensions and Characteristics of the New Economy

A New Economy is upon us. Its cornerstones are knowledge, technology globalization, and talent. In today's economy speed is critical. Product half-lives are becoming shorter and shorter and firm growth and survival may be as short as five years. Today's students will likely make many career changes in their lifetime (13 according to some experts) and enter into work relationships with several employers over time (7 to 12 different employers over a career). In this environment, change and the ability to change are likely to be key factors in establishing a competitive advantage and offering reasonable chances for success.

**Two ingredients of the "New Economy" are critical to any region's ability to compete: the quality of the workforce and quality of life.** Talented technical workers can pick where they want to live and then find a job. Retention and attraction of talent is becoming the primary competitive weapon of most firms. This requires well managed firms that provide incentives and rewards for performance and application of knowledge. In contrast to the locally focused "brawn" economy of the past – which required physical strength – the economy today has a world focus and requires mental strength – skills and knowledge — of its workers. **For Great Valley to compete, it must focus on building, keeping, and attracting enterprises that use and apply knowledge, technology, and talent.**

It makes little difference whether one examines the development of service enterprises using computers, smart cards, and fiber optic lines or the expansion of manufacturers using CNC machines, sensors, and computer controls. In the final analysis it is clear that the U.S. economy is becoming dependent on the knowledge worker to survive and grow. The same holds true for Great Valley.

# Great Valley Today

The region is already competitive in some areas of the New Economy. For example, it has access to an ample supply of highly educated workers. Many students who graduate from area colleges and universities or residents who leave the region to attend college cannot find meaningful employment in the region; some of the best and brightest are lost to other metropolitan areas. Of those who remain, many are underemployed due to a mismatch in their education/skill levels and the jobs currently available.

**Regional Strengths**

- Education and training resources
- Quality, productivity and stability of workforce
- Business climate
- Geographic location
- Cost of living
- Quality of life
- Strong economic development organizations
- Diversified economy
- Advanced telecommunication services

The region also has natural resources that are attractive to the outsider or newcomer. Besides mountains, forests, lakes, and outdoor recreation opportunities, there are appealing qualities related to the suburban environment, such as the small town charm, low crime, lack of traffic congestion, and lower costs of housing. It has also focused on tangibles that have a positive effect on the quality of life, such as developing Montage Mountain and attracting professional ice hockey and baseball teams.

The positive indicators of the region's quality of life and supply of educated workers do not mean that all the factors for integrating into the world economy are present. If that were the case, there would be no need to grow new firms or attract firms to the region — firms would be starting up or coming on their own accord. What hinders growth and further development in an area that has many positive characteristics are weaknesses that counterbalance the strengths.

Weaknesses that tend to be important to technology companies include the absence of strong research and development facilities, absence of a comprehensive graduate higher education base, lack of a strong entrepreneurial culture, insufficient number of technically skilled workers, and absence of downtown amenities that create an environment attractive to young workers. Related to this is the need to invest more in "technology infrastructure" to compete with other regions that have already established a critical mass of technology-driven enterprises. Lastly, inadequate employment opportunities means that students who come to the region's college and universities leave the region upon graduation and students who leave the region to attend college often do not return.

**Regional Weaknesses**

- Lack of a research and development base
- Insufficient graduate higher education
- Weak entrepreneurial culture
- Inadequate supply of technically skilled workers
- Lack of local venture capital
- Lack of vibrant downtowns
- Lack of amenities that appeal to young professionals
- Parochialism and lack of regional identity
- Local government fragmentation
- Image
- Aging population
- Inadequate employment opportunities
- Inability to retain college graduates in region

There are also a number of factors that may threaten the region's current competitive position. Companies that choose the region as a location because of its favorable cost structure may decide to move to lower cost locations offshore. The lack of high wage employment opportunities will continue to result in an outflow of the region's best and brightest students. The region's lack of technically skilled workers may cause technology-intensive companies and manufacturers to leave the region. As a result, the region's future economic base may be composed of warehousing, travel and tourism, and retirees.

**Threats**

- Low-cost operations will move offshore
- Underemployment will increase the outmigration of young workers
- Lack of new economy anchors will make the region vulnerable to high unemployment
- Continued fragmentation of local government will result in blighted neighborhoods and concentrations of low income populations
- Without an educated workforce, existing technology companies will leave the region

The analysis of the strengths and weaknesses of the region reveals that there are a number of opportunities on which the region could build. These include:

- **Leveraging the region's higher education institutions** to position the region to build a technology base;
- **Capitalizing on scenic and recreational amenities** to market the region as an attractive location for technology companies;
- **Building on existing call center operations** to develop higher wage, higher value added jobs;
- **Capturing expansion of information technology and new media companies** from the New York metropolitan area;
- **Accessing talents and interest of successful entrepreneurs and CEOs** in the region as mentors and investors; and
- **Capitalizing on past investments in industrial and technology parks.**

# Building the Great Valley Technology Economy

This report is the culmination of a nine-month planning process to develop an action strategy to position the region as a leader in the nation's technology-driven economy. It involved business and community leaders, the region's higher education institutions, and organizations committed to developing the economy of The Great Valley. The strategies and actions outlined in this plan are designed to help the region achieve the following vision:

> *The Great Valley is recognized as a center of innovative entrepreneurial activity and knowledge-based industrial growth. Its economy, anchored by key clusters of technology-based companies, provides good, well paying jobs and career opportunities for its local graduates, and those*

*attracted to the region. The region has an excellent quality of life and a technology infrastructure built on strong partnerships among the region's educational institutions, businesses and governments.*

Although it is ambitious and involves risk-taking, this vision is attainable. The main text of the document lays out specific goals, actions, and implementation steps around six key strategies that will help the region achieve this vision. The paragraphs below summarize the key strategies.

## 1. Information Technology Growth Strategy

The Great Valley should seek to develop a core competence and specialization in the area of information technology – including new media and E-commerce.[1] Information technology has been chosen as a focus for the Great Valley region because the region already has a sizeable base of activity in the related areas of information storage, retrieval, and communications, and information processing centers. In addition, the region's colleges and universities provide a unique resource, which can be built upon to meet the need for highly skilled information technology workers. The liberal arts curriculum of Great Valley's colleges and universities fits well with the needs of information technology companies, particularly those that specialize in developing content for Internet and web-based applications.

**Information Technology Action**

- Create Great Valley Information Technology Institute

The development of a core competence in information technology can be achieved by encouraging information technology-related start-up companies, attracting information technology companies to locate in the region, and helping existing companies to incorporate information technologies into their operations and production processes. This kind of specialization is an "enabling technology" for service, manufacturing, and technology firms; industry should strive to incorporate it into all of its operations.

Implementation of this strategy should be carried out by an Information Technology Institute, which will include the region's educational institutions and existing information technology companies. Its purpose should be to ensure the region has an adequate supply of workers with the skills required by information technology companies. It also should serve as a research and development base for companies that provide information technology services and companies in which there is a significant need, such as the health care industry.

## 2. Technology Infrastructure Investment Strategy

The competitiveness of a regional economy is increasingly dependent on its technology infrastructure. In the past infrastructure meant physical infrastructure such as roads, bridges, rail, and telephone access; today it includes the availability of advanced technology infrastructure such as fiber optics networks, smart buildings, and high speed Internet access. To attract new technology-based companies, the region must invest in infrastructure that supports them. The Great Valley currently lacks office space equipped to handle information and other related high technology companies. It is recommended that the region consider establishing a technology incubator and a regional multi-tenant facility, sometimes called an accelerator, to house growing technology companies. The region would also benefit from additional transportation services especially improved air services, an important consideration for technology companies seeking a location.

**Technology Infrastructure Actions**

- Establish regional information technology incubator
- Establish regional multi-tenant accelerator for growing technology firms, e.g. "smart building"
- Re-establish rail service to NEW YORK CITY and expand air service
- Improve air service

## 3. Innovation and Entrepreneurship Strategy

**Entrepreneurship Actions**

- Form Angel Investors and Mentoring Network
- Create Great Valley Innovation Fund
- Celebrate entrepreneurial success

Currently Great Valley does not have a strong entrepreneurial culture. Historical data on business births and deaths indicate that large multi-national firms have dominated the region. In today's economy it is becoming increasingly clear that the key to success is innovation. The well paying jobs of tomorrow will most likely come from fast growing entrepreneurial start-up companies. In order to ensure that the region is poised to grow new industries and high wage jobs, the region should focus its resources on creating a world-class environment for technological innovators and entrepreneurs. This can be accomplished by providing a comprehensive range of services to support entrepreneurs and new company start-ups, and encouraging greater entrepreneurship on the part of the region's students and citizens.

## 4. Knowledge Worker Retention and Attraction Strategy

People – that is, talent -- are the most important asset to technology-driven firms – not bricks and mortar, equipment, or products. It is critical to have a labor pool that is conversant and skilled in particular fields in order to build a strong technology driven economy. Access to courses, certificates, and degrees that enable employees to stay abreast of changes and advance their careers are extremely important to technology workers. Such workers have a particularly high demand for additional education opportunities as a life-long proposition. In addition to meeting the educational needs of technology workers, the Great Valley also will have to increase the percentage of high school graduates that pursue post secondary education. College graduates should be encouraged to stay and pursue career opportunities within the region and the region should offer sufficient opportunities to attract talent from surrounding regions, the nation and the world.

**Knowledge Worker Actions**

- Expand graduate programs
- Institute internship and cooperative programs for students/faculty
- Establish job placement/career development services
- Launch campaign to attract successful natives to return
- Encourage college graduates to stay in region

## 5. Enhancement of Quality of Life Strategy

The Great Valley is rich in outdoor amenities and has a wonderful natural landscape. Strategic investments in new sports facilities and recreational attractions have helped integrate this resource into the regional economy. However, the region still lacks the kinds of amenities demanded by younger knowledge workers, such as loft-like or studio apartment rental housing, coffee shops, outdoor cafes, gallery spaces, health clubs, and restaurants. The region should focus on adapting the region's two major downtown areas to be more attractive to young knowledge workers. The region must invest in the amenities and quality of life required to attract and retain knowledge workers. This can be achieved by implementing an amenity strategy designed to leverage its significant market of college age students to develop downtown areas that will attract and hold knowledge workers. In addition, the region should seek to develop outdoor activities, such as mountain biking or rock climbing that appeal to young professionals.

**Quality of Life Actions**

- Build a stronger set of downtown amenities
- Establish young professionals association
- Build partnerships with cities and colleges and universities
- Develop opportunities for outdoor activities

## 6. Industry Assistance Strategy

The Great Valley has a broad and diverse set of existing industries. Although manufacturing employment fell by 10,000 jobs between 1989 and 1998, the region still remains slightly more manufacturing-intensive than the U.S. as a whole. The region's manufacturing industries also have declined at rates significantly higher than the national average. Finally, an analysis of the region's economic clusters found very few linkages among the region's manufacturers. To better leverage the capabilities of the region's manufacturing base, and build strength in its service industries including health, logistics, GIS, and other areas, it is important to foster linkages among existing industries and ensure that companies are aware of and have access to the latest technologies. The region should establish a Manufacturing Technology Network to provide a forum in which the region's industries address common needs and share information on successful innovative practices.

**Assisting Existing Industry Actions**

- Develop Manufacturing Technology Network
- Assess technology needs of emerging clusters including health care, logistics, GIS and materials handling

The region also has experienced strong growth in the services sector, particularly health services, education, and business services. However, these industries did not grow as fast as their national counterparts. The region should consider implementing initiatives to accelerate the application of advanced technologies, particularly information technologies, into the region's service industries, through the proposed Information Technology Institute.

## Implementation Plan

**Implementation Plan**

- Recruit Leaders
- Establish Great Valley Regional Collaborative
- Initiate image campaign
- Build consensus and a shared vision of the region's economic future
- Obtain resources
- Focus on priorities
- Measure progress

Leadership committed to pursuing a regional approach will be required to pursue and implement the strategies and actions outlined above. Building a knowledge-based technology economy, which requires a long-term commitment, will also require that the region focus on certain key priorities. First among these, is the creation of a new facilitating network, the Great Valley Regional Collaborative, to oversee implementation of the strategy.

The Great Valley Regional Collaborative should be a public-private partnership funded by industry and philanthropic sources, with the objective of setting a bipartisan agenda for the region's economic growth and development. The Great Valley Regional Collaborative should take steps to build

consensus on what the region wants to look like in the future, mobilize resources, and track progress in implementing the strategy. It should reflect the principles of the New Economy; that is, it should be designed as a horizontal or network organization, ***connecting*** groups and organizations around common goals. Its goal should be to articulate a vision of the region's future and build consensus around that vision. The Collaborative should help shepherd the shift of the region to a new technology-rich, knowledge-based economy.

Top priority should also be placed on establishing the Great Valley Information Technology Institute and implementing the Angel and Mentoring Network and the Great Valley Innovation Fund. Finally, steps should be taken to quickly initiate cooperative and internships programs between regional industry and students and faculty in area colleges and universities. These are actions that should be initiated immediately.

**Overall Priorities**

- Establish Great Valley Regional Collaborative
- Establish Great Valley Information Technology Institute
- Create an Angel and Mentoring Network and Great Valley Innovation Fund
- Initiate programs, such as internships and cooperative programs, to retain college graduates in the region
- Undertake marketing campaign
- Initiate amenities strategies for region's downtowns

It also will be important to conduct an image campaign to promote the "Great Valley" both within the region and outside the region. The goal of the image campaign should be to transform the citizens of the region into promoters of their region and optimists on their future, rather than accept what others might perceive. This is a first step in building a reputation for the region as an attractive location for technology-based companies.

The implementation of this set of key strategies requires significant resources. It should start with the commitment of the private sector in both the organizational and marketing efforts, as well as in the investment in key priorities. Any assistance from the public sector should be requested not as a principal resource, but rather as an interim resource to fill the gap until regional commitments are obtained. The principal resources should be secured from the philanthropic, non-profit, and industrial communities in the region. It will be easier to obtain public funds if this is viewed as helping build on a broad local coalition, across counties, cities, and neighborhoods. Recognizing that the entire region is in this together is an important first step. Securing private and non-governmental resources will ensure that these efforts remain private sector-driven, which is necessary for the success of this set of strategies. Lastly, a system to track progress in achieving Great Valley's strategy and program goals should be established. Regular performance assessment helps identify which programs and policies are most effective and can identify areas where changes are needed.

## Conclusion

The Great Valley is poised to recast its economy, its destiny and future. In this New Economy the focus will be on investing in people – not just attracting and recruiting firms. Skilled knowledge workers will create the industries of the future. Existing industries can become technology-driven, adapting what and how they make things, based on using and applying technologies. Building a stronger technology infrastructure including the attributes of a graduate higher education and applied research base is critical to the region's full participation in the New Economy of the future.

If the region does not overcome its weaknesses and build on its strengths, it is likely to face again a situation of technological obsolescence, as occurred with the heavy industry of the past and the apparel industry of more recent time. Its base in low cost operations such as call centers and data processing centers may be eclipsed by a worldwide virtual economy where the Internet and electronic commerce take away the region's low cost advantages. **Rather than waiting for this to happen, the region and its leaders need to build on its strengths — its colleges and universities, the work ethic of its employees, and its quality of life — to continue to grow a New Economy grounded on the diversified base it has already successfully established.**

This technology strategy for Great Valley is predicated on and requires the ability of the region's citizens to accept, welcome, and incorporate change as a matter of normal course. It seeks to build on the strengths of the region but it also takes into account threats — from worldwide competition to product obsolescence — and new opportunities that the digital age and the New Economy offer.

Change is required if the economic future of the region is to be brighter for the region's sons and daughters and grandsons and granddaughters. It has been a long time since the region's citizens could say to their children "You do not have to look elsewhere for a good job and good pay." The vision outlined in this strategy will enable the region's residents to say "stay here" and raise a family. It will not be easy to accomplish but it is not impossible. It will require a willingness to change, to try new things, and, most of all, to work together to achieve a common regional economic future.

# Introduction

Regions across the United States are facing a dramatic transformation as the nation moves to an economy driven by technology industries and the application of technology in traditional industries. This economy is headlined in the media as the New Economy, the Information Age, the Knowledge-Based Economy, and the Technology-Based Economy. In this document, the term "New Economy" is used, highlighting the aspect of change. The New Economy is less dependent on making and growing things, and more dependent on ideas and innovation. Knowledge has replaced raw materials and physical labor as the source of value, wealth, and economic prosperity.

The importance of high technology firms in today's economy can hardly be overstated. Employees in high technology industries earn significantly more than those in other industries. In 1996, the average pay per employee in high technology industries was 67 percent higher than the average pay per employee for all other industries ($44,041 as compared to $26,363).[2] Information technology is credited with one-third of U.S. economic growth between 1995 and 1998, according to the U.S. Department of Commerce.

Equally significant is the impact that changes in technology are having on traditional industries. The Internet and E-commerce alone will change fundamentally every industry in the coming decades. E-commerce between businesses began roughly in 1995; by 2002 it is expected to be used for some $300 billion worth of transactions.[3] To compete in this New Economy, regions must have an economic base composed of firms that constantly innovate and maximize the use of technology in the workplace.

Recognizing the fundamental changes taking place in today's economy, the Greater Scranton Chamber of Commerce and the Greater Wilkes-Barre Chamber of Business and Industry initiated a planning process to develop a strategy and action plan that would position the region to grow a technology-based economy. Battelle Memorial Institute's Technology Partnership Practice was chosen to assist in designing the strategy. Dr. Richard Florida, H. John Heinz III Professor of Regional Economic Development at the John Heinz III School of Public Policy and Management, Carnegie Mellon University, assisted in developing the strategy, along with Dr. Edward Feser, Assistant Professor, Urban and Regional Planning, University of North Carolina-Chapel Hill.

The project included three inter-related components:

- The project team interviewed more than 100 individuals representing the region's business community, higher education institutions and local governments to determine what factors are perceived to be competitive advantages of the region and what factors put the region at a competitive disadvantage in terms of attracting technology-based development.

- An economic cluster analysis was prepared by Dr. Feser. Findings from this analysis are referenced throughout this report. A copy of his report, *Regional Growth Clusters in the Scranton-Wilkes-Barre-Hazleton MSA*, is available from the project's sponsors.

- The development of this document, which proposes strategies and actions to develop a technology-based economy that provides high wage employment and a high standard of living for the residents of "Great Valley", a region centered on the cities of Scranton and Wilkes-Barre and encompassing Lackawanna and Luzerne Counties.

## Economic History of Great Valley

The Great Valley contributed significantly to our nation's economic growth. At one time the third largest population center in Pennsylvania, Great Valley was a thriving center of the industrial revolution, helping to lead the United States from an agrarian economy to an industrial economy that was the envy of developed countries around the world. The region's economy capitalized on its natural resource base – coal – and its excellent waterways and rail lines. But as demand for the region's coal declined, the region saw its competitive advantages erode.

During the post-war years, the region embarked on a second wave of industrial development, which resulted in the establishment of a strong apparel industry. This industry too has declined as low labor costs and modern machinery have placed the region at a competitive disadvantage, first to other regions of the country, and then to international competition.

The region's third wave of economic development focused on diversifying its economic base attracting both service companies and manufacturers to locate in the region. Today, the Great Valley ranks among the top ten centers in the U.S. in information processing. It has become a preferred location for call centers, warehousing, and distribution. The region also has a highly diversified manufacturing base. The manufacturing firms in the region engage in a wide range of activities from advanced technology (semiconductors, electronics, instruments, plastics, and glass) to more mature sectors (printing and publishing, metalworking, and paper). Retail services, as elsewhere in the country, now represent a significant portion of the economic base. Indeed, the region's diversification strategy has succeeded.

Yet, the region continues to face economic problems. Today, Great Valley approaches the 21st Century recognizing that the foundations on which its economy was based are no longer the solid anchors that they once were. The region has been successful in diversifying its economy primarily by marketing

itself as a low cost place to do business, but in today's technology-driven economy being the lowest cost place to do business is no longer sufficient to compete. In the New Economy, it is the capacity to generate knowledge, to innovate, and to retain and attract talent that will determine which regions succeed and grow.

## The Challenge Facing Great Valley

A New Economy is upon us. In 2050, Americans will look back with an understanding that the U.S. economy was transformed in the last decade of the 20th century. In today's New Economy, two ingredients are critical to any region's ability to compete: the quality of the workforce and quality of life. Talented technical workers can choose where they want to live and companies will locate where there is an adequate supply of technically skilled workers. Retaining and attracting talent is becoming the primary competitive weapon of most firms. To keep employees, firms must provide incentives and rewards for performance and application of knowledge. In contrast to Great Valley's past economy that required physical strength, the New Economy depends on mental strength, i.e. the skills and knowledge of its workforce. For Great Valley to compete in this New Economy, it must focus on building, keeping, and attracting enterprises that use and apply knowledge, technology, and talent.

Whether it is a service firm using computers, smart cards, and fiber optic lines or a manufacturer using CNC machines, sensors, and computer controls, the U.S. economy is becoming dependent on the knowledge worker to survive and grow. So too must Great Valley. And while Great Valley has features that make it an attractive place to live and work, it also lacks many of the requirements needed to support a technology-based economy. These include a strong research and development base, a critical mass of technology companies, and a large number of technically skilled workers. The region also lacks many of the amenities to attract and retain knowledge workers.

This knowledge-based strategy was developed to guide the Great Valley as the region seeks to transition to the New Economy. It is predicated on the willingness of the region's residents and leaders to accept, welcome and incorporate change as a matter of normal behavior. It seeks to build on the strengths of Great Valley but it also recognizes weaknesses that must be addressed.

# Assessing the Region's Economic Competitiveness

The project team conducted interviews with business leaders, college and university presidents, community representatives, legislators, government officials, and economic development program managers. Business people were asked to assess the advantages and disadvantages of their location, the nature and quality of the work force, and the technological infrastructure of the region. They were also asked to suggest industry or technology areas with potential for future growth. The academic community was queried regarding program offerings, the make-up of the student body and their relationship with the business community. They also were asked to identify the major strengths and weaknesses of the Great Valley economy and how any weaknesses might be addressed. Finally, they were asked to identify areas with growth potential and indicate what would be required to build a knowledge-based economy in the Great Valley. This section summarizes the key findings from these interviews.

**Economic Facts and Figures**

- Between 1990 and 1996, the region's population declined by 1.6% while the population in the US increased by 6.7%.
- Between 1990 and 1998, the percentage of the region's population aged 19 – 32 years old declined from 20% to 16%.
- Less than 2% of the region's population is non-white.
- Median household income is approximately $30,300 compared to $34,400 for the Commonwealth of Pennsylvania and $34,100 for the nation.
- The region's unemployment rate has been above the U.S. average since 1985.
- The region's average annual wage of $24,673 is significantly less than the Philadelphia and New York metro areas, which are $33,308 and $41,521 respectively.

## Key Findings From Interviews with Local Leaders

*The region is perceived as an excellent location for businesses*. Business executives pointed to the region's geographic location, the quality and productivity of the workforce, and an excellent quality of life as factors that make the region an attractive location. Below average costs and an excellent business climate were also frequently mentioned as advantages of the region.

*The Great Valley's physical and technology infrastructure is strong*. Businesses have access to telecommunications services and high speed Internet access. While the region has excellent highway access, a number of business executives cite the lack of better air service from the Wilkes-Barre/Scranton International Airport as a disadvantage for the region.

*Residents of the region choose to live in the region because it offers a high quality of life.* The environment is attractive and recreational opportunities abound. A common theme heard during the interviews was that the region is a "good place to raise a family." Quality of life is strong for traditional values but may not have all the attributes

necessary to attract and retain the knowledge and talent workers needed to grow the economy in the future.

*The region benefits from its proximity to the New York City, Philadelphia and Washington, D.C. metropolitan areas*. Some of the colleges and universities reported that the majority of their students come from these areas. Some business executives indicated that their company chose to locate in the region because it was close to the company's headquarters in New York City.

**Regional Strengths**

- Education and training resources
- Quality, productivity and stability of workforce
- Business climate
- Geographic location
- Cost of living
- Quality of life
- Strong economic development organizations
- Diversified economy
- Advanced telecommunication services

*The Great Valley has access to excellent education and training resources but lacks strong graduate education and applied research and development centers.* The region is home to twelve institutions of higher education. While many of these institutions actively engage the business community, the individuals interviewed felt that these relationships should be expanded.

*The Great Valley has a well-established and effective network of economic development organizations*. However, local government is fragmented and leadership is needed at the regional level. Most of the individuals interviewed expressed appreciation that this strategy received support from both the Scranton and Wilkes-Barre communities. Many people indicated that greater collaboration between Lackawanna and Luzerne Counties and the cities of Scranton and Wilkes-Barre is needed.

*In spite of the region's attractiveness, employers reported difficulty in finding adequate numbers of skilled technical workers*. They also reported that recruiting such workers is often difficult due to the region's lack of diversity in the population and lack of amenities that appeal to young professionals. Investments to improve the downtown areas of both Scranton and Wilkes-Barre were suggested as an approach to make the cities more attractive to young professionals.

*The region lacks a research and development base.* The interviews with business leaders revealed that few companies conduct any research and development at their locations in Great Valley. Also, there are no research universities or federal or corporate laboratories in the region that generate technology and new discoveries.

**Regional Weaknesses**

- Lack of a research and development base
- Insufficient graduate higher education
- Weak entrepreneurial culture
- Inadequate supply of technically skilled workers
- Lack of local venture capital
- Lack of vibrant downtowns
- Lack of amenities that appeal to young professionals
- Parochialism and lack of regional identity
- Local government fragmentation
- Image
- Aging population
- Inadequate employment opportunities
- Inability to retain college graduates in region

*People from outside the region as well as many natives have a poor image of the region*. Individuals frequently stated that one of the major obstacles to growing a technology-based economy in the Great Valley is the region's poor image. The perception persists that the region's economy is dying. People from outside the region still think of it as a coal-mining region, consequently lacking in favorable quality of life.

*The Great Valley lacks a strong entrepreneurial culture.* As a result of past experiences during economic downturns, the workforce tends to be risk-averse. Workers are more likely to stay in a position that is secure than to consider other options including starting a company, or changing jobs or careers. Yet, it is small innovative companies that are driving growth in regions with a strong technology-based economy.

*The region fails to keep and attract young knowledge workers.* Younger, well-educated workers tend to leave the region because there are inadequate employment opportunities. Others leave to pursue graduate programs that are not available locally. In addition, the region fails to attract young professionals because it is viewed as lacking amenities, such as high quality downtown rental housing, nightlife, and certain outdoor recreational amenities.

*The region suffers from fragmented local government, lack of a regional identity and a long history of non-cooperative relationships among communities, organizations, and citizenry.*
The region according to many interviewed suffers from a over-competitive, adversarial set of relationships that makes it difficult to get things done for the overall benefit of the region.

**Threats**

- Low-cost operations will move offshore
- Underemployment will increase the outmigration of young workers
- Lack of new economy anchors will make the region vulnerable to high unemployment
- Continued fragmentation of local government will result in blighted neighborhoods and concentrations of low income populations
- Without an educated workforce, existing technology companies will leave the region

There are also a number of factors that may threaten the region's current competitive position. Companies that choose the region as a location because of its favorable cost structure may decide to move to lower cost locations offshore. The lack of high wage employment opportunities will continue to result in an outflow of the region's best and brightest students. The region's lack of technically skilled workers may cause technology-intensive companies and manufacturers to leave the region. As a result, the region's future economic base may be composed of warehousing, travel and tourism, and retirees.

Based on this analysis of strengths and weaknesses, the following key opportunities were identified:

- Leverage region's higher education institutions to position region to build a technology base;
- Capitalize on scenic and recreational amenities to market the region as an attractive location for technology companies;
- Build on existing call center operations to develop higher wage, higher value added jobs;
- Capture expansion of information technology and new media companies from the New York metropolitan area by marketing the presence of liberal arts graduates with the skills these companies need;
- Access talents and interest of successful entrepreneurs and CEOs in the region as mentors and investors; and
- Capitalize on past investments in industrial and technology parks.

## Results of Economic Cluster Analysis

To supplement the data collected from the interviews and to get a fact-based appraisal of the region's economic base and economic trends, a form of economic analysis called a regional cluster analysis was performed. Cluster analysis is a way of looking at regional strengths and weaknesses in particular industry sectors, referred to as clusters. In this case, the cluster analysis performed by Professor Edward Feser of the University of North Carolina, identified both regional clusters of industry and labor. The key findings of the cluster analysis are:

- The performance of several traditional industries in the region, including apparel, industrial machinery and equipment, lumber and wood products, food and kindred products, paper and allied products and fabricated metal products have declined at rates significantly higher than the national average for their industry.

- A series of new, smaller industries are emerging around which regional growth may be catalyzed. These potential growth sectors include trucking and warehousing, logistics, finance, and advanced manufacturing industries such as electronic equipment and instruments.

- Information technologies, including information processing, is a common enabling technology for many of these new growth sectors.

### *Findings*

- *The Great Valley has a broad set of manufacturers but they are not particularly specialized.* The manufacturing base is extremely diversified; except in a few areas, there are only a few manufacturers in each subsector. Few manufacturers undertake their R & D in the region; some firms are owned or allied with foreign owned firms that undertake the R & D elsewhere and manufacture the resulting product in the

region. There are examples of manufacturing firms that have started in the Great Valley and have grown locally; again, rarely do they conduct significant R & D.

- *The Great Valley's manufacturing sector continues to decline*. Manufacturing employment fell by 10,700 jobs between 1989-98 period. Thirteen of twenty industries lost workers between 1989-98; the most significant losses were in apparel, industrial machinery and equipment, lumber and wood products, food and kindred products, paper and allied products, and fabricated metal products. Although the manufacturing sector is contracting nationwide, all of the above industries declined at rates significantly higher than the national average for their industry

- *There is an above-average concentration of telemarketing firms, catalog order firms, and other call centers.* Some of these firms are classified in their core industry, e.g., insurance, department stores, finance. Employment in communications services, which includes a lot of call center and telemarketing activity, declined by 1.3% annually between 1989-96 and then rebounded over the 1996-98 period when it generated over 600 net new jobs.

- *The region is clearly going through a transition from an industrial, manufacturing base to an information-driven economy.* The significant shift under way in the region's economy is graphically displayed in Figure 1. Virtually none of the most competitive sectors in terms of estimated start-ups and growth (competitive shift) would be regarded as traditional regional strengths. Information technologies, including information processing, GIS, and other technologies, is a common enabling technology for many of these new growth prospects for the region.

- *The trend in this region is to the services industry, which parallels economic shifts occurring nationwide*. The region still remains slightly more manufacturing intensive than the U.S. as a whole. The region experienced a growth in services by 21.6% in the 1989-96 period, driven mainly by employment growth in health services, education, social services and membership organizations, and business services (including call centers). However, the growth of the major services industries in the region was not as rapid as it was nationally. In short, while the services industry accounted for most new jobs in the region between 1989-96, it does not appear to be a key competitive advantage for the region.

- *The Great Valley does have some technology intensive industries that are experiencing growth*. Among the seven manufacturing sectors to add employment over the period, most notable are two technology intensive industries: electronic and other electrical equipment, and instruments and related products. Growth in both industries appears to be well out-pacing national averages (both industries declined at the national level in this time period).

- *The region's economic base also has subsectors upon which to build including health services (laboratories and hospitals), electronics and instruments, and transportation services, shipping and logistics.* Both health services and transportation logistics build on existing strengths. The success of the health sector will require the cultivation of stronger linkages to research, including universities. The health industry, although it constitutes the second largest labor cluster in the region, is focused on the provision of local, largely standardized services rather than "exportable" activities such as specialized treatments and facilities, technology-intensive suppliers and equipment, research and testing capabilities, and biomedical research and production. The sheer size and concentration of health-related activity suggests the opportunity to develop more "exportable services." Without exception, major health industry clusters in the U.S. are associated with or proximate to major universities.

- *In the case of transportation logistics, the region possesses strategic location vis-à-vis major markets in the eastern U.S.* With the growth of Internet commerce and just-in-time inventory and delivery systems, shipping and logistics have become increasingly technology-intensive industries. In the transportation and public utilities industry, the trucking and warehousing, air transportation, and communications services sectors accounted for most new jobs generated between 1989 and 1998. When compared to annualized U.S. growth rates, trucking and warehousing and air transportation out-performed national averages by considerable margins. **Trucking and warehousing is the only sector in the region that represents a specialization, has gotten more competitive since 1989, and appears to have generated considerable startup activity**.[4] Transporting bulk commodities represents a comparative advantage of the warehousing industry in the region. With the advent of communications and computer technologies, the region needs to examine opportunities for material handling of finished goods requiring assembly and distribution. In such cases, better paying jobs and career opportunities might emerge.

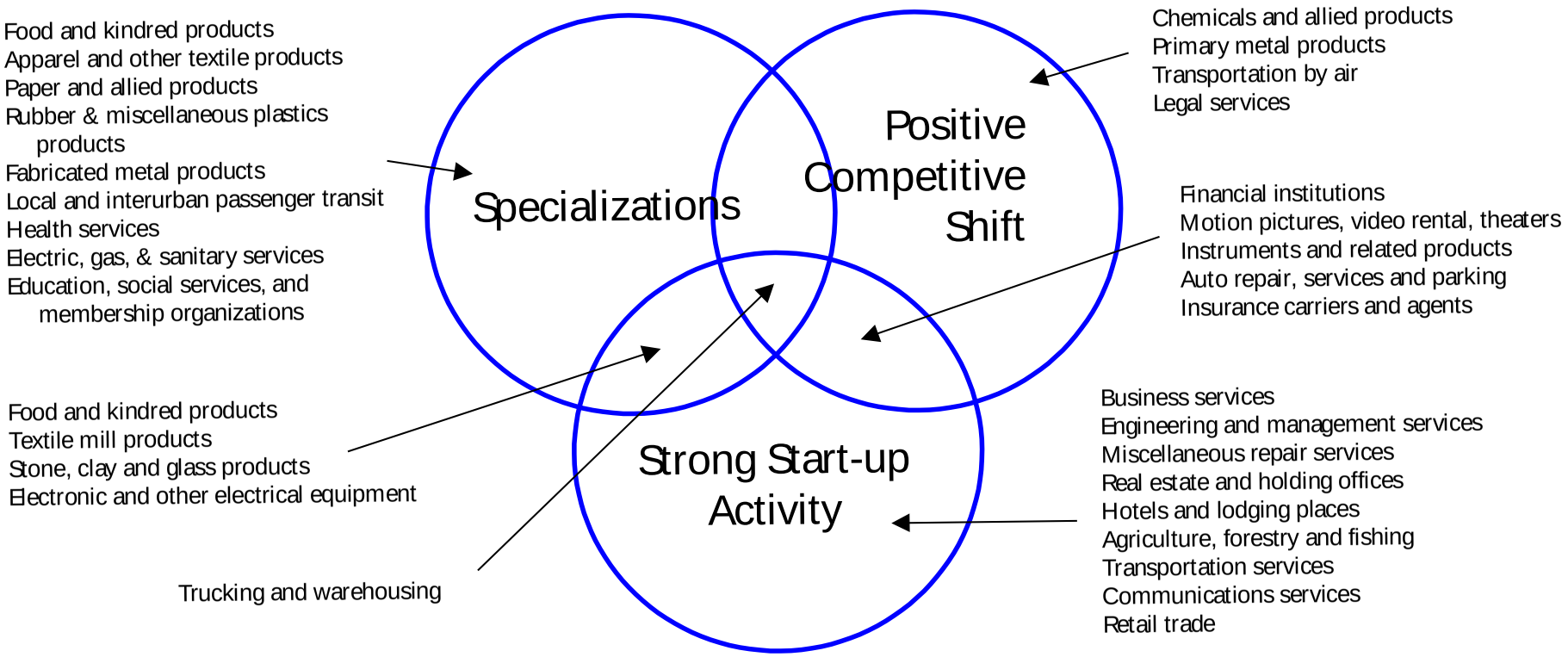
- *The electronics and instruments sector, while not large, is growing, with a few firms accounting for most of the activity*. Its solid growth since 1989 suggests further attention be given this base.

- *Printing and publishing stands out as a relative strength of the region.* It has demonstrated mixed performance in that while it represents a sizeable concentration, most of the activity is in low value segments of the publishing industry (printing and book distribution).

## *Analysis of Labor Clusters*

We also examined the competitiveness, growth and start-up experience of the region, based not on products made but on "labor clusters" or talent. The concept of labor

clusters defines industry by their common labor pools, rather than by industry products. The region's labor cluster is graphically portrayed in Figure 2. Figure 2 compares the strength of each of these labor clusters to projected U.S. employment growth to the year 2006. The size of the bubble is 1998 payroll of that labor cluster in the region. Again, we find how critical the health services, hospitals and lab cluster is to future job growth in the region. Finally, we again see the "New Economy" emerging in the region where knowledge intensive clusters including securities and insurance, legal and real estate, and transportation services, shipping and logistics are doing strong. Figure 2 also shows potential to move certain sectors upward and to the right including software, engineering and communications services; and electrical communications measuring and navigation equipment. Information technologies will drive many of these industries.




# Fig. 1 Summary of 2-digit Sector Trends

Sectors with Highest Values in Each Category

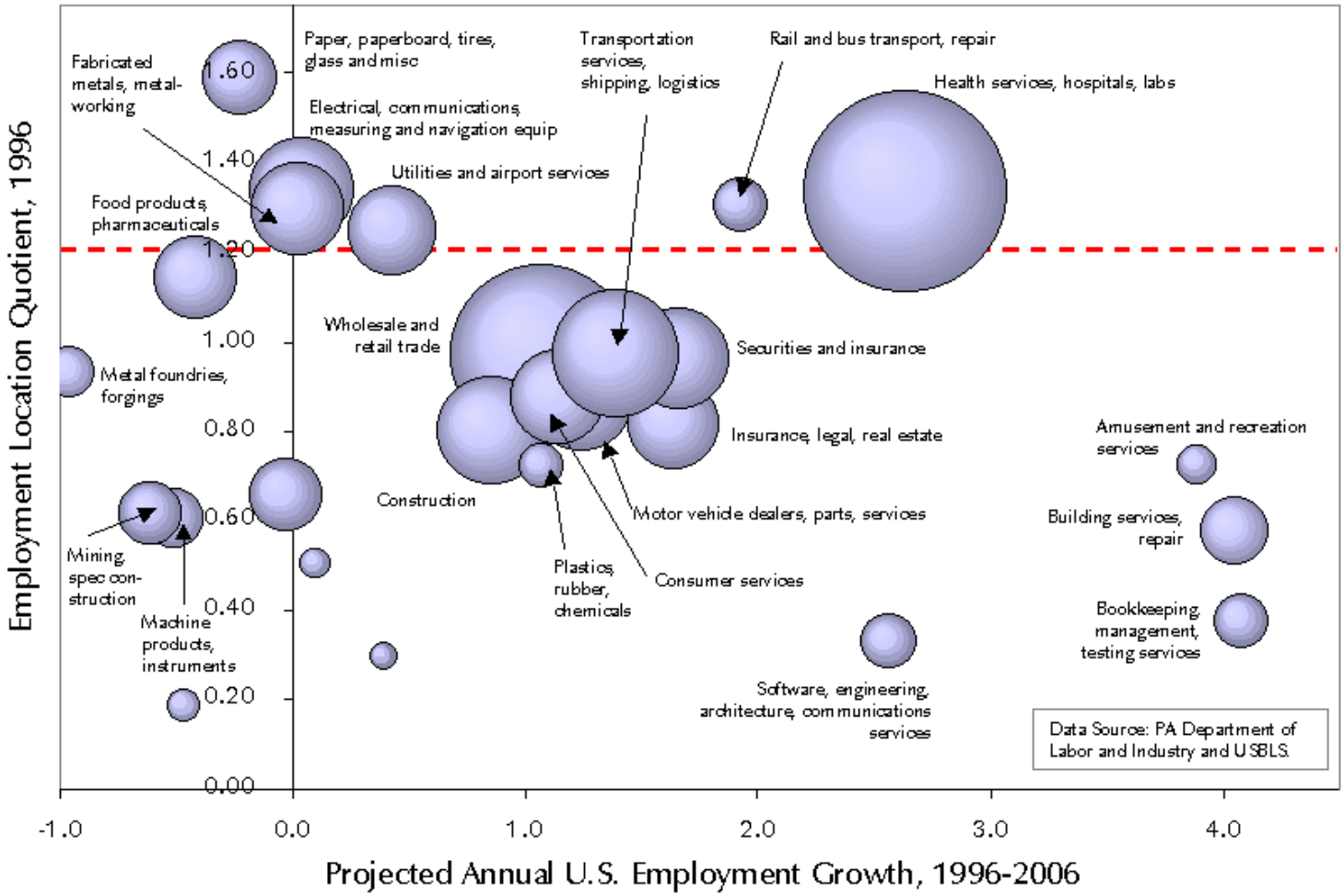



Fig. 2 Labor Clusters, SWH MSA Specializations and Projected U.S. Growth

(Size of circle is 1998 payroll.)

# Key Elements Needed to Support a Technology-Based Economy

Building a technology-based economy requires:

- A research and development base, i.e., universities and public or private research laboratories that generate new knowledge and discoveries;
- A highly skilled, technical workforce;
- An entrepreneurial culture;
- Excellent technology infrastructure including high quality telecommunications systems and affordable high speed Internet connections;
- Mechanisms through which knowledge is transferred from one individual to another or from one company to another;
- Risk capital;
- Supportive business climate; and
- Quality of life with the types of amenities that appeal to young technical workers.

This section reviews the resources available in the region to address each of these requirements.

## Research and Development Base

A common feature of regions having a strong base of technology-intensive companies is the presence of major research institutions. A recent report by the Milken Institute found that of the top 30 high-tech metro areas, 29 were home to or within close proximity to a major research university.[5] Entrepreneurs and technology-intensive firms need access to researchers and equipment to enable them to remain competitive.

The Great Valley has twelve higher education institutions, three of which are campuses of Penn State University, that offer a range of degrees, courses and curricula, primarily undergraduate with selective graduate education. However, for the most part, the region's colleges and universities do not conduct a significant amount of research and development, particularly in technical fields. If the region is to develop a technology-intensive economy, business and community leaders must find ways to develop R&D capabilities in the region or establish liaisons to access R & D research capabilities outside the region, such as Penn State University and Lehigh University.

## Technically Skilled and Talented Workforce

Gaining access to adequate numbers of technically skilled workers is perhaps the greatest challenge faced by the private sector today. More than 300,000 information technology jobs were unfilled in 1998, according to a report by the Information

Technology Association of America. The Bureau of Labor Statistics projects that an additional two million workers will be needed over the next ten years. Employers in the region revealed in interviews that they also have difficulty finding workers to fill technical positions, particularly in the areas of computing and systems integration.

Generating, attracting, and keeping highly skilled, technical workers will be key to building a technology-based economy in the region. In 1990, approximately 14 percent of Great Valley's population had a college degree, compared to 17 percent for the state of Pennsylvania and 20 percent nationally[6]. There is documentation and widespread concern that the region is suffering from the outmigration of talented young people who leave because of the lack of employment opportunities. As discussed earlier, the interviews conducted also revealed that employers experience some difficulty attracting younger professionals from other regions to relocate to Great Valley.

At the same time, the colleges and universities in the region succeed in attracting students from both within the region and from the Northeast and Mid-Atlantic regions. Table 1 lists the region's institutions of higher education. Table 2 lists the technical degrees and programs offered by the region's colleges and universities.

It is clear that the region's higher education resources are a key strength that need to be leveraged to better meet the needs of employers for technically skilled workers. The Computer Collaborative[7], established with the support of the Scranton and Wilkes-Barre Chambers of Commerce, is an example of the type of collaboration that will be needed in the future.

**Table 1. Scranton – Wilkes-Barre Higher Education Institutions**

| Educational Institutions |
|---|
| Johnson Technical Institute |
| Keystone College |
| King's College |
| Lackawanna Junior College |
| Luzerne County Community College |
| Marywood University |
| College Misericordia |
| Penn State - Hazleton |
| Penn State Worthington Scranton |
| Penn State - Wilkes Barre |
| University of Scranton |
| Wilkes University |

## Table 2. Scranton – Wilkes-Barre Educational Institutions: Program Offerings

| Educational Institution | AA | BA | BS | Graduate | Major Associate Fields of Study | Major Under-graduate Fields of Study | Graduate Fields of Study |
|---|---|---|---|---|---|---|---|
| Johnson Technical Institute | X | | | | Architectural Drafting and Design Technology, Automotive Technology, Biomedical Technology, Carpentry and Cabinetmaking, Electromechanical Technology, Electronics, Diesel Truck Technology, Machine Trades Technology, Tool and Dye Making Technology, Veterinary Science, Welding and Metal Fabrication Technology | | |
| Keystone College | X | | X | | Allied Health, Art, Biological Sciences, Business, Hospitality, Office Technology, Communication, Computer Information Systems, Culinary Arts, Early Childhood Education, Environmental Science and Forestry, Hospitality, Sports and Recreational Management | Criminal Justice, Business Administration Human Resource Management, Accounting and Taxation | |

| Educational Institution | AA | BA | BS | Graduate | Major Associate Fields of Study | Major Under-graduate Fields of Study | Graduate Fields of Study |
|---|---|---|---|---|---|---|---|
| King's College | X | X | X | X | Business Administration, Gerontology, Marketing | Accounting, Biology, Business Administration, Chemistry, Clinical Laboratory Science/Medical Technology, Computer Science, Computer and Information Systems, Criminal Justice, Education, Economics, English, Finance, French, Gerontology, Health Care Administration, History, Human Resource Management, International Business, Marketing, Mass Communications, Mathematics, Neuroscience, Philosophy, Medical Studies, Political Science, Sociology, Psychology, Spanish, Sports Medicine, Theology | Finance, Education, Health Care Administration, Physician Assistant Studies |
| Lackawanna Junior College | X | | | | Accounting Technician, Banking, Business Administration, Business Management, Business Science, Computer Information Services, Criminal Justice, Educational Transfer, Emergency Medical Services, Human Services, Legal Assistant, Liberal Arts, Medical Office Assistant, Office Technology and Administration, Industrial Manufacturing Studies | | |

| Educational Institution | AA | BA | BS | Graduate | Major Associate Fields of Study | Major Under-graduate Fields of Study | Graduate Fields of Study |
|---|---|---|---|---|---|---|---|
| Luzerne County Community College | X | | | | Automotive, Broadcast Communications/ Journalism, Accounting, Banking, Business Computer Information Systems, Health Care Management, International Business, Legal Assisting, Office Management Technology, Commercial Art, Health Services, Culinary Arts, Hotel and Restaurant Management, Computer Science, Mathematics, Nursing, Respiratory Therapy, Pre-Chiropractic, Pre-Pharmacy, Pre-Optometry, Pre-Mortuary Science, Science, Horticulture Technology, Child Development, Criminal Justice, Education, Human Services, Sociology, Aviation, Automated Manufacturing Systems Technology, Architectural Engineering Technology, Computer Aided Drafting and Design, Electrical Construction, Graphic Communications/ Printing Technology, Plumbing and Heating Technology, Electronics Engineering Technology, Building Maintenance Technology, Computer Systems Technology | | |

| Educational Institution | AA | BA | BS | Graduate | Major Associate Fields of Study | Major Under-graduate Fields of Study | Graduate Fields of Study |
|---|---|---|---|---|---|---|---|
| Marywood University | | X | X | X | | Art, Business and Managerial Science, Communication Arts, Communication Sciences and Disorders, Education, English Language and Literature, Foreign Languages, Health Physical Education, Mathematics, Music, Nursing, Nutrition and Dietetics, Psychology, Religious Studies, Biology, Environmental Science, Medical Technology/Clinical Laboratory Science, Social Work, Criminal Justice, History, Political Science, Public Administration , Sociology, Health Services Administration, Special Education | Arts, Speech-Language Pathology, Communications, Business Administration, Management Information Systems, Education, Foods and Nutrition, Music, Psychology/Counseling, Public Administration, Health Services Administration, Nursing, Physical Therapy, Occupation Therapy, Social Work, and Special Education Doctoral Degree in Human Development |
| College Misericordia | | X | X | X | | Accounting, Management, Marketing, Management Information Systems, Psychology, Social Work, Nursing, Radiography, English, History, Philosophy, Biology, Chemistry, Mathematics, Computer Science | Physical Therapy, Occupational Therapy, Nursing, Education, Organizational Management |
| Penn State – Hazleton | X | | X | | Business Administration, Information Sciences and Technology, Electrical Engineering Technology, Letters, Arts and Sciences, Mechanical Engineering Technology, Medical Laboratory Technology, Physical Therapist Assistance | Business, Marketing/ Management, Financial Services Penn State Hazelton offers the first two years of course work for most of the Pennsylvania State University's more than 160 baccalaureate majors. | |

| Educational Institution | AA | BA | BS | Graduate | Major Associate Fields of Study | Major Under-graduate Fields of Study | Graduate Fields of Study |
|---|---|---|---|---|---|---|---|
| Penn State – Worthington Scranton | X | | X | | Architectural Engineering Technology, Business Administration, Human Development & Family Studies, Information Sciences & Technology, Letters, Arts and Sciences, Nursing, Occupational Therapy | Business, Nursing, Human Development and Family Studies. Penn State Worthington Scranton offers the first two years of course work for most of the Pennsylvania State University's more than 160 baccalaureate majors. | |
| Penn State - Wilkes Barre | X | | X | | Information Sciences and Technology, Electrical Engineering Technology, Surveying Technology, Telecommunications Technology, Business Administration, and Letters, Arts, and Sciences | Electrical Engineering Technology, Surveying, Information Sciences and Technology. Four-year degrees that can be started at Penn State Wilkes-Barre: Agricultural Sciences, Arts, Architecture, Business Administration, Communications, Education, Engineering, Health and Human Development, Liberal Arts, Sciences, Information Sciences and Technology | |

| Educational Institution | AA | BA | BS | Graduate | Major Associate Fields of Study | Major Under-graduate Fields of Study | Graduate Fields of Study |
|---|---|---|---|---|---|---|---|
| University of Scranton | | X | X | X | | Accounting, Biochemistry, Biology, Biophysics, Chemistry, Classical Language, Communication, Computer Engineering, Computer Information Systems, Computer Science, Counseling, Criminal Justice, Early Childhood Education, Economics, Education, Electronics, Engineering, Elementary Education, English, Environmental Science, Exercise Science and Sport, Foreign Languages, Gerontology, Health Administration, History, Human Services, International Business International Studies, Management, Marketing, Mathematics, Medical Technology, Military Science, Modern Languages, Neuroscience, Nursing, Occupational Therapy, Operations Management, Philosophy, Physical Therapy, Physics, Political Science, Pre-Engineering, Pre-Health Professionals, Pre-Law, Pre-Medical, Psychology, Secondary Education, Sociology, Theatre, Theology/Religious Studies | Chemistry, Biochemistry, Clinical Chemistry, Community Counseling, Rehabilitation Counseling, School Counseling, Elementary and Secondary Education & Reading Education, School Administration Health Administration Human Resources Administration, Business Administration, Software Engineering, Theology, Nursing, English, History |

| Educational Institution | AA | BA | BS | Graduate | Major Associate Fields of Study | Major Under-graduate Fields of Study | Graduate Fields of Study |
|---|---|---|---|---|---|---|---|
| Wilkes University | | X | X | X | | Biology, Chemistry, Accounting, Business Administration, Education, Psychology, Engineering, Physics, English, Foreign Languages, History, Philosophy, Mathematics, Computer Science, Nursing, Economics, Communications, Political Science/Public Administration, Sociology, International Studies, Fine Arts, Pharmacy | Business Administration, Health Care Administration, Mathematics, Nursing, Education, Electrical Engineering, Physics Doctoral Degrees in Electrical Engineering and Physics |

## Entrepreneurial Culture

Presence of an entrepreneurial culture is difficult to define but is an important contributor to building a technology-based economy. In places with a strong entrepreneurial climate, starting a company is seen as a routine matter rather than an unusual occurrence; entrepreneurs are celebrated; individuals know many others who have started their own company; and company failure is seen as a possible outcome of doing business, not a cause for social disgrace.

A common theme emerging from the project team's interviews is that the region, similar to Pennsylvania as a whole, does not have a strong entrepreneurial culture. Historically, large multi-national firms have dominated the region. Data on business births and deaths support this observation. The Scranton-Wilkes-Barre region ranked 131st out of 134 small metropolitan areas in a 1998 study that ranked metropolitan regions based on their success in fostering the start-up and growth of new companies.[8]

### Entrepreneurial Climate Test

1. When the mayor of the city meets with business leaders, are there as many CEOs of mid-size companies as bankers and corporate executives?
2. Are entrepreneurs invited to join the best athletic, social, and country clubs? Have they joined?
3. Does the local newspaper follow the fortunes of start-ups and mid-size growth companies with the same intensity and sophistication as it does large corporations?
4. Are innovative companies able to recruit nearly all of their professional work force from the local area?
5. Is there a sizeable, visible venture capital community?
6. Does the local university encourage its faculty and its students to participate in entrepreneurial spin-offs, and do they?
7. Do growth company CEO's hold at least a quarter of the seats on the boards of the three largest banks?
8. Is there decent, affordable office and industrial space available for new businesses in the central business district?
9. Can you quickly think of 10 recent spin-offs – growth companies started by entrepreneurs who have left large companies?

Adapted from *Entrepreneurial Hot Spots* by David Birch, Anne Haggerty, and William Parsons.

Yet, it is clear that in today's economy the key to success is innovation. The well-paying jobs of tomorrow will most likely come from fast growing entrepreneurial start-up companies. In order to ensure that the Great Valley is poised to grow new industries and high wage jobs, the region will need to address its environment for technological innovators and entrepreneurs.

## Technology Infrastructure

The competitiveness of a region's economy is increasingly being measured in terms of its enabling infrastructure. In the past this meant roads, bridges, railroads, and telephone access; today it includes proximity to airports and technology infrastructure items such as fiber optics networks, high speed Internet access, small business incubators, accelerators, research and development anchors, etc. The Scranton-Wilkes-Barre-Hazleton region is strategically located near major markets in the Northeast and

Mid-Atlantic, and it is served by an excellent network of interstate highways. The region is also well equipped to meet the telecommunications needs of technology companies. Advanced telecommunications services and high speed Internet access are widely available for both residences and businesses. But the region lacks technology incubators and accelerators, as well as R & D anchors.

Air service is the one area identified in the company interviews that may need to be improved. More and more, as companies operate globally, technology companies consider the quality of air service to be a key factor in making location decisions. Airline travel today for high-growth companies is what rail travel was to the high growth companies in the 1890s.[9] The region benefits from its proximity to international airports in New York and New Jersey, but service from the region's airport needs to be improved.

In addition, quick and easy rail service to New York City could do much to better position Great Valley's ability to grow and attract industries such as "new media" and information technologies that need daily, easy commuting to clients and corporate headquarters.

## Knowledge Transfer

Much of the success of Silicon Valley and other technology-based economies can be attributed to the region's success in transferring knowledge and technology from universities to the private sector and among companies. In conducting interviews with both business and university leaders, it became apparent that Great Valley lacks a critical mass of entrepreneurs and small, technology-based companies. In addition, the region lacks mechanisms to bring together individuals who are interested in starting up or have started up new technology companies.

## Risk Capital

The availability of capital to support start-up and emerging companies — the type of companies on which the New Economy depends — is critical if a region is to grow a technology based economy. Although the availability of venture capital has increased greatly in the 1990s, these investments are geographically concentrated. Also, as the size of venture capital funds have increased, it has become increasingly difficult to obtain small amounts of pre-seed and seed capital, (e.g., less than $2 million).

The business leaders and entrepreneurs interviewed indicated that there are few sources of early stage pre-seed, seed, and venture capital in Great Valley. There is also no organized network of "angel" investors. Angel investors refer to private individuals who provide high risk, early stage capital to new ventures.

## Business Climate

Many of the traditional factors that make a location attractive to business are also important to technology-based companies. Local tax rates, wage rates, energy costs, capital costs, and land and office space costs are all a consideration as well as perception of the general business climate. Great Valley is very competitive in these areas. For example, wage rates are substantially lower than nearby metropolitan areas and the region has invested in the development of attractive industrial parks. In the opinion of the business leaders interviewed, this region has a very positive business climate.

## Quality of Life

Quality of life factors are particularly important to high technology companies that must compete for skilled technical workers. Young workers are highly mobile and can locate virtually anyplace they want. Survey research shows that amenities and environmental quality are in fact highly rated location factors of high technology firms.

While Great Valley provides a high quality of life for its established residents, it may not provide the types of amenities that are of primary interest to the young knowledge workers that the region will have to attract and retain to succeed in developing a technology-based economy. There is a substantial difference between the amenities of the New Economy and the amenities of the old economy. The amenity package of the old economy emphasized cultural amenities (symphony, theater, opera, and ballet) and professional sports teams, among others. The amenities of the New Economy include diverse, high quality yet casual restaurants, nightlife activities featuring music and artistic performances, and opportunities for recreational activities such as rock climbing, windsurfing, or cycling. The region may need to invest in outdoor recreational infrastructure and in creating vibrant downtown areas in order to develop and keep a workforce of young professionals.

# Building a Technology-Based Economy in Great Valley: Strategies and Actions

This document is the culmination of a nine-month planning process to develop an action plan that will position Great Valley to be a leader in the nation's technology-driven economy. It involved business and community leaders, the region's higher education institutions, the Greater Scranton and Greater Wilkes-Barre Chambers of Commerce, and various organizations committed to developing the economy of the region. The strategies and actions outlined in this section, if implemented, are designed to help the region achieve the following vision.

> *Great Valley is recognized as a center of innovative entrepreneurial activity and knowledge-based industrial growth. It's economy, anchored by key clusters of technology-based companies, provides good, well paying jobs and career opportunities for its local graduates and those attracted to the region. The region has an excellent quality of life and an economic development infrastructure built on strong partnerships among the region's educational institutions, businesses and governments.*

This vision is ambitious and requires risk-taking, but it is attainable.

Six key strategies are proposed to achieve this vision. They are:

- ***Build a knowledge economy in Great Valley by developing a core competency in information technologies.***
- ***Invest in technology infrastructure.***
- ***Support and build a culture that encourages innovation and entrepreneurship.***
- ***Attract, retain and develop knowledge workers.***
- ***Maintain and improve the region's quality of life and amenities.***
- ***Assist Great Valley industry to develop and use advanced technologies***.

Table 3 summarizes the strategies and actions that are described in detail below.

## Table 3. Summary of Proposed Strategies and Actions

| Strategies | Actions |
|---|---|
| Build a knowledge economy in Great Valley by developing a core competency in information technologies | Create Great Valley Information Technology Institute |
| Invest in technology infrastructure | Establish a regional information technology incubator |
| | Establish a regional multi-tenant facility (accelerator) for growing technology firms |
| | Re-establish rail service to New York City |
| | Improve air service from Wilkes-Barre/Scranton International Airport |
| Support and build a culture that encourages innovation and entrepreneurship (capital, labor, education) | Form Angel Investor and Mentoring Network |
| | Create Great Valley Innovation Fund |
| | Celebrate entrepreneurial success |
| Attract, retain, and develop knowledge workers | Expand graduate programs |
| | Institute internship and cooperative programs for students/faculty |
| | Establish career development/job placement services |
| | Launch campaign to attract successful Great Valley natives to return to the region |
| | Encourage college graduates to stay in region |
| Maintain and improve the region's quality of life and amenities | Develop an amenity strategy linked to the knowledge economy |
| | Facilitate the creation of a young professionals' organization |
| | Develop partnership between colleges and universities and the cities of Scranton and Wilkes-Barre to create an environment attractive to young professionals |
| | Develop outdoor activities of interest to young knowledge workers |
| Assist Great Valley industry to develop and use advanced technologies | Develop Manufacturing Technology Network |
| | Assess future clusters with Information Technology Institute, including health care, logistics, GIS and materials handling |

## Information Technology Growth Strategy

### Build a knowledge economy in Great Valley by developing a core competency in information technologies

Great Valley should seek to establish a core competence in information technologies, including new media and E-commerce. This core capability is designed to assist both emerging and existing industries to compete in the global economy as a key "enabling" technology cutting across all industries and sectors. Information technologies as a focus of attention can lead to creating start-up firms, helping existing firms to incorporate information technologies into their existing operations and production processes, and help to attract information technology and other firms to locate in the region.

Information technology, the infrastructure and knowledge that is necessary to make information available rapidly, affects all sectors of the economy.[10] It includes software, E-commerce, the communications services that patch equipment together, E-commerce, online information services, mobile communications, and aspects of biotechnology such as gene mapping and bioinformatics. Information technology's success requires continuous innovation, interactive relationships and collaboration. A significant portion of business costs involves the collection, exchange and use of information. In a global economy, information is the most valuable resource. Firms invest in information technologies to boost production efficiency, improve communication flows, and enhance business operations.

Information technology has been chosen as a focus for the Great Valley region for the following reasons:

- **Research suggests that those regions having a disproportionate share of industries or firms proficient at deploying information technology will experience superior economic performance**. Regions of the U.S. most likely to grow are those that can best take advantage of innovations in computers, communications equipment, other high tech products and associated knowledge-based services.

- **Great Valley has a sizeable base of activity in two areas that may be used as a base for further development of an information technology capability**. It has a strong base of firms that deal with aspects of information storage, retrieval, and communications, including the production of CDs and DVDs, book publishing, and record management and storage. It has a base of information processing centers that have become more value added over time, e.g., from data entry to programming, placing Great Valley among leaders in information processing types of

firms. The key will be to build on this base to create more locally based knowledge jobs in programming, design, and management and in products and services – content providers and producers. Moving up the "value chain" from data entry clerks to call center operators to programmers has already occurred at some firms in the region.

- **The region's colleges and universities provide a unique resource, which can be built upon to meet the need for highly skilled information technology workers and applied research and development.** The liberal arts curriculum fits well with the growth of content driven information firms, moving from how to move information to actually collecting, analyzing, and applying information in new ways. Furthermore, many of the graduates of the region's colleges and universities have difficulty finding local employment. They, therefore, either leave the area or become underemployed. These graduates, most of whom hold liberal arts degrees, could provide a ready workforce for information, E-commerce, and new media firms. Many of the existing programs in regional colleges and universities simply need to be overlaid with specialized programs in communications graphics, design, business management, writing, web and internet based searches, data mining, GIS, and other related skills to provide students with specialized information technology skills.

- **Nationally, the information technology industry is growing significantly with very high demand for workers throughout the country**. Its biggest obstacle to growth is finding sufficient numbers of educated and trainable workers. The region's growth potential in information processing is a strong base on which to build.

- **Proximity to several metropolitan areas from New York City, through Philadelphia to Washington, D.C., provides Great Valley with a locational advantage in attracting the operations of information technology firms, including new media and E-commerce firms**. The region may be well poised to benefit from the integration of Internet and various aspects of information storage and retrieval. This could include attraction of content providers to the region or repositioning of the region's current information technology base to play a key role in the production of goods and services for new media end users.

## *Information Technologies and Great Valley*

Our interviews, previous studies, and other reports generally suggest that the factors most important to sustaining an information technology base include:

- **An educated workforce.** People are the most important asset to technology-driven firms – not bricks and mortar, equipment, or even product. Having both an available labor pool and one conversant and skilled in particular fields is critical to

the success of those regions wanting to build a strong technology-driven economy. Access to courses, certificates, and degrees that enable employees to stay abreast of changes and advance their careers are extremely important to technology workers. Such workers have an insatiable demand for additional education as a life-long proposition.

- **Proximity to research institutions.** Having a major center of intellectual capital nearby – brainpower and a source of ideas and creativity – is absolutely critical to building a regional technology economy. Without a major research university, research institutes, federal labs, or private research centers, it is difficult for regions to be successful as technology centers.

Given these factors, to position Great Valley for the 21st Century information technology economy, the region is going to have to address a number of "gaps" or deficiencies, namely:

- Building the equivalent of a research university base in the region, including the programs and courses needed for information technology industries; and
- Better networking the resources among and between higher education institutions.

## Action 1: Create a Great Valley Information Technology Institute

To compete in the "New Economy," Great Valley must build on the assets it already has. Its large number of colleges and universities represents one of these assets. These institutions graduate a substantial number of individuals each year and offer continuing education opportunities that increasingly attract part-time students and full-time workers in the region. These institutions represent large importers annually of talent to the region. They are also large exporters of talent annually as well.

Great Valley does not have any institution with the scale of a technical research university. However, it does provide advanced technical programs at various schools. For example, the University of Scranton has software engineering graduate degree programs and a research institute. Marywood University has 45 percent of its students enrolled in graduate programs. Wilkes University and King's College offer a number of graduate programs. Because these are separate and somewhat isolated facilities, and few programs address the needs of the technology workforce, the broad perception is that the region has no focused undergraduate and graduate programs in information technologies, including multi-media.

Obviously this is not true. But a more concerted effort is needed to "scale up" existing course offerings to develop specialized undergraduate and graduate

education programs for a technology workforce, and provide capabilities for conducting specialized research. This would help establish an information technology core competency in Great Valley.

The liberal arts graduate base of the region could be the foundation of an information technology capability. The region, while not currently strong in information technologies industries, has been successful in attracting part of that chain of firms – call centers, CD manufacturers, publishing and printing, and data processing centers. The challenge is to build on this base to create more programming, design, E-commerce and management jobs for both content providers and producers.

## *Proposed Institute*

Because the region has no major research university around which to build a broad-based information technology capability, it is proposed that a new Information Technology Institute be formed. It should include all twelve higher education institutions and existing information technology companies in the region. The Institute might be seen as the equivalent of a specialized Technological University for Information Technology. The Institute will:

- help provide education and training programs for future and current workers in information technologies;
- ensure the region has a large supply of available workers with the broad skills inventory?? required by information technology and other industries,
- serve as a research and development base for information technology and other industries; and
- Serve as a key information technology anchor for the I-81 Technology Corridor.

It is also proposed that the Institute undertake the applied research, product testing, and technical assistance that will be needed by industry to maximize information technology applications to their needs and problems.

*Education and Training Activities*

The Institute itself would not offer degrees. Students could still enroll in and receive degrees from any member of the Institute. The Institute would be staffed to provide leadership and coordination of programs, courses and degrees across member higher education institutions. The Institute would undertake "needs" surveys of employees and employers alike. The Institute would address and identify the skill levels that would create a strong local labor pool of graduates in information technologies. It would also insure there is available in

Great Valley a strong component of lifelong education so as to fulfill the needs of the part-time student / full-time employee interested in updating his or her skills.

**Table 4. Roles and Responsibilities of Information Technology Institute**

| | |
|---|---|
| **Education & Training** | One stop shopping for higher education information technical assistance<br>Industry needs assessments<br>Establish programs, degrees, courses (credit) with education members<br>Establish non-credit short courses, certificates, workshops |
| **Research and Development** | Applications and product development R & D<br>Prototype development<br>Entrepreneurial assistance and support<br>Joint faculty appointments with education members<br>Testbed and demonstration facilities |

The Institute would offer non-degree non-credit workshops, seminars, and certificate programs (shown in surveys to be increasingly of high interest of technology firms and their employees). The Institute would serve as matchmaker for designing and developing multi-institutional undergraduate and graduate degrees in various information technology fields. No institution would give up its degree granting powers but by combining the resources of participating institutions, the equivalent of a graduate research university can be created in Great Valley offering the interdisciplinary degrees required by "new media" and other information technology firms. Each member institution would retain degree-granting authority but would agree to transfer credits from other institutions in order for its students to receive various degrees and certificates.

By bringing together, on a voluntary basis, the twelve higher education institutions in the region, the Institute will build on existing expertise, capabilities and facilities. Pooling the capabilities of member schools in various fields will enable the

**How the Institute Would Work**

A multi-media graduate degree might be offered by one or more institutions. The program could include software engineering courses from the University of Scranton; communications arts or mass communications courses from King's College, information sciences and management courses from Marywood University, and electrical engineering courses from Wilkes University.

An undergraduate degree in English from College Misericordia might include taking educational media courses at Marywood University; GIS mapping at Wilkes University or Kings College; and desktop publishing at Luzerne Community College.

Institute to establish interdisciplinary, multi-institutional programs that can help develop the region's future workforce. At the same time, such programs will provide the region's graduates with better career and job prospects upon graduation, whether they stay in the region or not.

Responding to the needs of emerging industries, existing industries, and firms being attracted to the region will provide a basis for the Institute to develop the capabilities to design and implement quality programs, quickly and responsively. In addition, the Institute can work to insure that the core requirements and concentrations among area colleges and universities are complementary and can seek to improve the level of integration and coordination over time. The Institute's educational work should address both short-term training needs and long-term educational needs of industry.

**An Example for Building Great Valley's Information Technology Base: New Media and New York**

The region's proximity to the New York City metropolitan area, a leading center of new media companies, provides an opportunity to capture some of the expansion growth of this industry. Great Valley should be attractive as a location for these companies because graduates of the region's colleges and universities possess many of the basic skills required to become workers in these industries.

The new media industry (see Exhibit 1. Background on the New Media Industry) involves the creative internet/web work with advertising, fashion, finance, and other service industries. Information technology is an "enabling" industry. Liberal arts graduates have a strong base in this industry and the kinds of programs and degrees offered among institutions in Great Valley provide a sound base to offer a range of concentrations in new media, multi-media and information technologies. Great Valley could be one of the first regions in the U.S. to offer and prepare a workforce for this industry.

In short, the Institute, through its members, will offer a comprehensive array of undergraduate and graduate programs, degrees, and certificates that are as responsive to the needs of information technology, e-commerce, new media, and other firms as are available in any region in the country.

The Institute would also help develop and prepare a pool of skilled individuals that would be qualified to work for firms that start up or move their operations to Great Valley. As a result, quality of the region's workforce would become a powerful marketing element, just as the region's low cost of living was in the past. The education level of employees of the region's call centers demonstrates the strong interest of college graduates to stay in the region, but also indicates that relative lack of career opportunities for the region's graduates as well, resulting in significant underemployment.

Information technology workers must constantly upgrade skills in response to rapid changes in the information technology industry. The proposed Institute would also address the need for skills upgrading.

Specific *educational* programs that could be offered by the Institute include:

**Alumni Attraction.** The Institute and its members could identify and encourage alumni involved in the information technology industry to participate

as speakers and lecturers, as mentors, and as contributors to the formation and implementation of the Institute. Successful information technology entrepreneurs might be attracted back to the region to start their next venture, as well as to assist budding entrepreneurs.

**Fellowship Program.** The Institute might establish a Fellows Program, whereby nationally known information technology leaders would be designated as Fellows to work for from several months to a year, at the Institute. They would participate in a Northeast Fellows Information Technology Conference that would bring information technology leaders around the country to Great Valley once a year for presentations on trends and developments in selective fields of information technology.

**Scholarship Program.** The Institute could offer scholarships and/or loans to students with partial loan forgiveness for every year the student remains employed in Great Valley upon graduation. This would complement a similar program tied to residency in Pennsylvania, sponsored by the Commonwealth.

**Collaborative Networking Programs and Activities**. The Institute should sponsor seminars, programs, and other networking events and promote its facility as a place where individuals interested in information technology congregate. Awards programs would be convened and sponsored by the Institute for various personnel within firms – human relations, technology officers, CFOs. In short, the Institute would sponsor networking activities undertaken by Technology Councils elsewhere.

**Marketing the Region**. An additional, somewhat unusual role is proposed for the Institute. It would serve as the support arm and clearinghouse for economic development groups and organizations in the region on trends, developments, and opportunities related to information technology. The Institute would be the "eyes and ears" for these groups, making sure the region takes actions to have the technology infrastructure in place to respond to a fast-changing industry. The Institute would undertake research, bring together the colleges and universities, and serve as a "one stop shop" for industry to learn about opportunities and assistance available from the region's higher education institutions.

*Research Role of the Institute*

The Institute could also serve as the anchor for the region's applied research work. In addition to undertaking prototype development work for firms, the Institute would seek to bundle technologies from across the U.S. around which to establish technology platforms that can lead to the launching of new

technology firms in the region. The Institute would also attract technology firms to locate in the region.

Over time, as a critical mass of such technology firms locate in the region, the Institute would shift its focus to assisting these firms in their product development and diversification, serving as their R & D product development group. Such an Institute could be used to help recruit faculty who would hold joint appointments with the Institute and one or more member institutions. This would enable member colleges and universities to expand their expertise and increase their research work in information technologies.

The Institute could offer test bed and demonstration facilities for firms to collaborate in such areas as communications, data management and storage, and new media. Table 5 lists services that could be offered by the Institute.

**Table 5. Information Technology Institute Industrial Services**

| Assistance to Industry | |
|---|---|
| Technical Assistance | ▪ Offer information technology test bed and demonstration facilities around communications, data management and storage and new media applications<br>▪ Undertake prototype development work for firms, particularly those in the incubator and/or accelerator (see later discussion)<br>▪ Assist companies with product development and diversification, serving as the R & D product development group for industries in the region unable to undertake R & D on their own or lacking the specialized facilities to undertake this work. |
| Development | ▪ Seek and bundle technologies from across the US in universities, federal labs and larger firms around which to establish technology platforms that can lead to launching new firms |
| Training | ▪ Offer ongoing seminars and workshops both for information technology firms and manufacturers and other firms incorporating information technology into their operations including helping incorporate E-commerce tools into retail and other service operations in the region. |

*Building on Great Valley's Capabilities*

The Institute should focus its education and research efforts on the region's comparative advantages in information technologies. The *Regional Economic Analysis*, performed as part of this project, found that these strengths include health, electronics, E-commerce/internet, Geographic Information Systems (GIS), and logistics. While the Institute cannot build capacity in all of these areas at once, the business plan should identify the priorities and time frame, as well as

steps necessary to build the Institute's expertise, partnering with the region's higher education institutions. In some instances, a partnership can be established rather quickly, such as in the case of GIS, around the Geographic Information Systems Center, supported by both Wilkes and King's Colleges. In other cases, capacity will have to be established based on available resources. The Institute should also develop links to regional efforts such as the Computer Collaborative.

## Exhibit 1. Background on the New Media

New media is generally defined as a product that is digital and interactive and integrates at least three of the four basic types of information – text, sound, images or video. It usually refers to the combination of digital photo, graphic, video, and sound and animation components in interactive presentations that inform, teach or entertain. It involves the convergence of many different disciplines including computer graphics, digital imaging, media, 3D animation, business administration, communications and cinematography.

New media serve training, business product, entertainment, and information/reference markets. Modes for delivery of new media include reference materials (games, training and sales materials, instruction manuals, catalogs) and distributive media (CD-ROMs, DVD, diskettes, Internet, interactive TV). The industry has taken off with the introduction of CD-ROMs followed closely by DVD and the Internet with much of the growth occurring in the creators/developers who create content and develop new media applications.

Five thousand new media companies or divisions operate in the New York area, of which half view "new media" as their main business. Sixty-eight percent of these firms have been in business for three years or less. In 1997, this industry generated $5.7 billion in gross revenues in the New York region and employed 106,000 persons, an increase of 48% between 1995 and 1997. While the heart of the industry is "Silicon Alley", firms can also be found in adjoining states. The industry depends on suppliers and subcontractors, must deal with complex, rapidly changing products, and has a low degree of vertical integration.

"New media" firms are primarily involved in content design and development, including such products and services as programming for on-line/internet services; interactive creative/design services for advertising agencies; title development for CD ROM/cartridges; and film/video/animation services. On average each "new media" firm is involved in three content categories among the following: advertising and marketing, information and reference, software design, they provide new approaches for marketing, image enhancement, and distribution and delivery of information services to clients from wholesalers and manufacturers to consumers. Content providers and producers service financial, advertising, fashion, entertainment, and related industries in the New York City region. Using the internet, web-based software, and the tools and techniques of communications and entertainment, education, financial services, retailing, training, and culture.

Key technical skills desired include knowledge of computers and applications, animation, imaging, lighting, program authoring, audio, MIDI workstations, and special effects software. Other personal skills include cross functionality, interpersonal, project management, creativity, business, communication, content and technical skills.

Key occupations in this industry are visual, creative or interactive designers, producers, video assemblers, producers, graphic designers, programmers, data processors, sales representations, sound technicians, system developers, marketing experts, interactive scriptwriters, authors/designers, writers, and others. The industry is divided between those wanting generalists or specialists, but all camps agree that the common skill deficiency is that technicians lack creative/artistic skills and artists lack technician skill. Hallmarks of the industry are a young worker age group, well educated and computer literate.

# Technology Infrastructure Investment Strategy

## Invest in the region's technology infrastructure

If Great Valley is to compete for technology-based growth, the region must provide the infrastructure demanded by technology companies. This means high quality schools, excellent transportation access, good municipal services, fully equipped, "smart buildings", office space in attractive settings, "smart highways", and state-of-the-art telecommunications services. Over the years, Great Valley has invested in industrial parks, buildings, and facilities. The region must be prepared to make continued investments to maintain the quality of its infrastructure and to improve services and facilities where they are lacking. The Great Valley region currently lacks office space equipped to handle information and other related high technology firms, and it lacks support services for new technology start-up companies. The region would also benefit from additional transportation services and from technology enhanced transportation that would enhance its favorable geographical location for technology-driven logistics and distribution.

### Action 1: Establish a regional information technology incubator.

The region should consider creating an incubator targeted for information technology companies. Building the region's capabilities in information technologies, as outlined in the Information Technology Growth Strategy, creates a basis for the development and application of information technologies. But if there are insufficient space and support services to nurture the entrepreneurs that either spin out of the Information Technology Institute or entrepreneurs that are attracted to work with it, the region's economy will continue to suffer. The region will continue to have a low birth rate of technology firms and a high death rate.

Technology incubators are generally located on or near university campuses. Of the some 600 incubators in the U.S., approximately one-quarter are closely associated with colleges and universities and predominantly populated by technology-related firms. One option would be to create an incubator in conjunction with one or more of the region's universities or colleges. On the other hand, should the incubator and Information Technology Institute proposed earlier, be co-located, it might be wise to locate the facility midway between Wilkes-Barre and Scranton. Another alternative is to consider a network of incubators, whereby, over time, the successful Carbondale Technology Center would manage its existing facility as well as facilities in both Wilkes-Barre and Scranton. This would maximize economies of scale. The Carbondale incubator

now has a number of information technology firms in it, and thus has experience with these kinds of firms.

### Action 2: Establish a regional multi-tenant facility (accelerator) for growing technology firms.

In addition to an incubator, the region's leadership should consider an accelerator. Graduates of incubators often need a facility in which to move after graduation. A multi-tenant "accelerator" that is also a "smart building," wired for worldwide connectivity and co-located with the Institute might be an ideal situation. One scenario is a "smart" building housing the Institute and accelerator, supported with several incubators throughout the region over time. The "accelerator" should be a "smart building" such as 55 Broad Street, in New York City, with the capability to be linked worldwide over various media including fiber, modem, satellite, wireless, and other technologies, with such access provided to the tenants of the facility. The "MetroTech" building in Scranton already has this capability.

Co-locating the Institute with the incubator and or accelerator would encourage close linkages between the education and research work of the Institute and start-up and later stage information technology firms.

The accelerator can also serve as an initial location for firms attracted from outside the region that desire a "toe-hold", e.g., getting their feet wet initially, prior to moving entire operations to the region.

### Action 3: Re-establish rail service to New York City.

Building direct rail service from New York City to Scranton and Wilkes-Barre is a critical technology infrastructure investment to attract new media and other information technology firms from New York City. This is a key regional project, critical to building a stronger regional economy. While this will require action by the State of New Jersey and Commonwealth of Pennsylvania and, perhaps, federal support, it is an extremely important regional project that utilizes what many consider to be traditional infrastructure in ways to build the region's technology future. To attract information technology entrepreneurs and firms from New York City, it is vitally important that there be curb-to-curb rail service to Great Valley. A demonstration high speed, information age train service would ideally help build the image of the Valley as a technology economy.

### Action 4: Improve air service from the Wilkes-Barre/Scranton International Airport

Air service is of extreme importance to technology firms. Unless air service is adequately addressed, this problem could seriously impede the region's technological development efforts. In surveys of technology firms, it has been found, time and again, that accessible, affordable air service is high on the list of priorities desired by such firms. Whereas "connectivity" in the old economy meant bridges and highways, connectivity in the New Economy means air service.

To build a technology base in Great Valley, the related issues of available air service and its pricing will need to be addressed. Increased airline competition in offerings from the airport could address both issues but this is unlikely until more demand for service is demonstrated, expressed in actual volume of passenger use. The region faces a strange paradox in that business travelers from the region tend to fly out of Allentown, Philadelphia and even Newark rather than using the Wilkes-Barre/Scranton International Airport. The use of these larger airports decreases demand at the Wilkes-Barre/Scranton International Airport. A concerted effort to attract new regional carriers to serve new markets from Wilkes-Barre/Scranton International Airport will require commitments from the major employers in the region that their employees fly out of the region's own airport. The lack of local business use of the regional airport siphons off much of the local demand that would generate increased availability of air service and more competitive pricing.

## Innovation and Entrepreneurship Strategy

### Support and build a culture that encourages innovation and entrepreneurship

The region has a number of ongoing programs to support entrepreneurs and new start-up companies. They include:

- Allan Kirby Center for Entrepreneurship, Wilkes University;
- Ben Franklin Technology Partners of Northeastern Pennsylvania;
- Carbondale Technology Center – Incubation services and financing;
- Economic Development Council of Northeastern Pennsylvania (EDCNP);
- Entrepreneurial Network – under development with support from PA Department of Community and Economic Development;
- Mentoring and financial support programs sponsored by the Chambers of Commerce; and

- Small Business Development Centers located at Wilkes University and the University of Scranton.

Despite the number of organizations providing some level of entrepreneurial assistance services, entrepreneurs and service providers interviewed indicated that resources are difficult to access and there are gaps in the existing entrepreneurial support system. They also indicated that the resident's of the region do not have a strong history of entrepreneurial development.

Gaps identified include:

- No single point of contact for entrepreneurial support services;
- Lack of networking opportunities for entrepreneurs and CEO's of small, start-up technology-based companies;
- Lack of locally available seed and venture capital;
- Lack of facilities for small start-up companies; and
- Absence of local entrepreneurial role models.

A number of actions are necessary to build an entrepreneurial culture in the region. They include increasing the in-depth assistance and mentoring available to potential entrepreneurs, ensuring the availability of early-stage pre-seed and seed capital, and celebrating the success of entrepreneurial role models.

### Action 1: Form angel investor and mentoring network

Access to information and knowledge about starting a firm is difficult to access. Recently an entrepreneurship database has been initiated by EDCNP in cooperation with many other groups and organizations. This web-based system should make it easier for entrepreneurs and potential entrepreneurs to readily get information essential to starting their businesses.

Efforts should be undertaken to expand assistance and support from business service providers and successful entrepreneurs – both of which can serve as mentors to individual entrepreneurs. This will expand support of entrepreneurs considerably. Mentoring networks have been particularly successful in mature technology regions. In less mature technology regions, business service providers, working in conjunction with the few technology mentors available, have served as effective brokers and problem-solvers for entrepreneurs.

Almost every area of the country is having difficulty finding funding support for start-up companies. Angel investors are one source of very early stage capital and some regions have successfully organized and tapped angel investor networks. But angel investors can only take a firm so far. Nationwide, there is

little available funding support for entrepreneurs in the range of $100,000 to $2,000,000. This is generally called "pre-seed" to "seed" capital stage. Institutional-supported venture capitalists generally will only make investments above $2 million except in special circumstances. This is due to several factors. Funds are getting so large that the venture funds do not have enough staff to handle small deals; the time commitments for a $100,000 investment are the same as a $2 million investment, sometimes more. Finally, these are high risk, long term investments and most venture capitalists would rather fund deals closer to a stage where the firm will go public and the venture fund can cash out.

Great Valley, similar to many regions in the U.S., lacks local sources of risk capital. To ensure the availability of "pre-seed" and "seed capital, Great Valley should organize an angel network and create an Innovation Fund.

An angel network of high network individuals should be formed by successful regional industrialists to invest in the technology-related start-ups and spin-offs that would come from the incubator/accelerator, the Information Technologies Institute, and other initiatives in this strategy. The angel network also can mentor entrepreneurs. This angel network would operate in relative anonymity, except for holding regular luncheons at which entrepreneurs are given the opportunity to present their business plans. Staffing involves simply the logistics of mailings, and organizing events. Each member of the network makes his or her own investments, although all members of the network must annually set a goal of the level of investment they intend to make.

## Action 2: Create Great Valley Innovation Fund

It is proposed that Great Valley establish a Pre-Seed Innovation Fund, perhaps through a for-profit private corporation that can also directly apply for federal SBIR awards that could be further used to assist companies. Funding for this Fund would come from foundations, individuals, and industry. Its investments would be in the form of equity investments, and the focus should be on industries discussed earlier —information technology companies, health, electronics, E-commerce/Internet, logistics and GIS.

The Fund should provide pre-seed and seed stage investments, attracting outside venture capitalists at later stages. Successful technology regions have found that it is absolutely essential that indigenous venture capital be available at all stages of the life cycle of technology firms. There is limited pre-seed and seed venture capital available throughout the country. So it will be necessary for the region to create its own fund. Once established the firms it invests in at the

early stages, as they mature, will attract outside later stage venture capital to the region.

To the extent feasible, the Innovation Fund also should provide close mentoring help to the companies in which it invests. This is particularly important in light of the limited entrepreneurial experience in the region with technology-based businesses. And, given the entrepreneurial base, investors should be very patient in the volume of their investments, at least initially until the results of other parts of these strategies translate into new ventures and new firms.

### Action 3: Celebrate entrepreneurial success.

It is important for the region's citizens to understand and become educated on "entrepreneurship" and "entrepreneurs." Our interviews found very little understanding or knowledge of the subject. If citizens believe that the only way to create jobs is by attracting firms to the region, then the efforts of this strategy --building an entrepreneurial culture -- will not be supported and sustained. It requires a considerable time period to build a critical mass of entrepreneurs.

There are already examples of successful entrepreneurs in the region, but their successes are not widely known. There are some local television programs and sporadic feature articles in local media about entrepreneurship but these media presentations need to be seen on a more systematic basis. Successful entrepreneurs need to be rewarded and encouraged. They become role models. "Entrepreneur of the Year" awards by the various chambers and economic development groups can send a strong signal of interest in entrepreneurship. So could the formation of an Entrepreneurship Business Plan Competition, as has been done in other regions.

## Knowledge Worker Retention and Attraction Strategy

### Attract, retain, and develop knowledge workers

The education level of employees of the region's call centers demonstrates the strong interest of college graduates to stay in the region (e.g., up to two-thirds of such workers have college degrees) but also indicates a relative lack of career opportunities for the region's graduates. Part of the role of the proposed Information Tech Consortium would be to help develop and prepare a pool of skilled individuals qualified to work for firms that start up or move their operations to Great Valley.

The work of the Computer Collaborative demonstrates both the interest and opportunities presented by increased interaction and discussions between industry and

higher education. New leadership at many of the region's colleges and universities represents an opportunity to further forge collaborative endeavors that both help each institution meet its educational mission while contributing to the development of the region's economy.

The region's higher education institutions vary in the degree to which their student bodies are made up of local vs. out of region students; the extent to which they have graduate programs; their focus in terms of technical vs. liberal arts subject matter; and their individual visions, missions and strategies. However, our interviews with these leaders and their key staff suggests that there is considerably more room for collaborative ventures than has been the case in the past. Further, there seems a genuine understanding that collaboration can be a "win-win" proposition. The rapid changes in careers, firms, and products require higher education to become much more agile. Collaborative ventures provide additional ways to perform such agility without having to go through long, complex internal processes usually necessary in higher education.

One of the region's competitive advantages in a national economy where workers are at a premium and educated workers are in large demand is its educated workforce. Providing educated workers, not just in information technologies-related fields as discussed previously, but in other areas in which the region's growth is moving and is likely to move are also important. This includes the areas of health, electronics and instruments, business and consumer services, logistics and transportation services.

Temporarily, the region has a competitive advantage and can better utilize its underemployed workers. At some point in the future, the region must boost its percentage of high school graduates that pursue post secondary education, and encourage those that do to recognize that there are career options and opportunities by staying in the region after graduation. Internships, cooperative programs, and use of industry adjunct faculty are all ways to encourage students to increase their interaction with local employers prior to graduation. In addition, the business community must reach out to the students at the K-12 level to make them aware of career opportunities within the region to encourage more students to pursue opportunities with current and projected worker shortages.

### Action 1: Expand graduate programs.

The region must increase, through its higher education institutions, the ability of its local graduates to stay in the area, graduate, and be able to pursue graduate degrees without leaving the area. Although with distance learning, location no longer remains a primary consideration in obtaining an education, employers and employees alike will insist upon some local physical presence. On-site faculty/student interaction is also still desirable. Expanded graduate education is

likely, at least in the short term, to involve primarily the part-time student and full-time worker. Over time, however, life long learning opportunities for the entire workforce is likely to become the norm, resulting in sabbatical, released time, short course programs, and certificate programs becoming more prevalent. While many larger firms are creating in-house learning centers, this region is not likely to benefit from such efforts given that the employment base is primarily in small and medium size firms.

To build a technology and knowledge-based economy, Great Valley must expand graduate offerings. This might be accomplished by:

- Linking local MBA programs, with concentrations in E-commerce and Internet, as Marywood University is now doing, with the new Informatics Program at Penn State University;

- Reviewing and considering biomedical/biotech advanced degrees in conjunction with the molecular biology programs at both King's College and the University of Scranton;

- Revamping MBA programs to include not just an MIS focus but business communications and engineering focus. Industry increasingly wants individuals that understand communications and engineering and its business implications;

- Offering certificates, short courses, and MBA programs focused on entrepreneurship; and

- Expanding programs in electronics to provide 2+2+2 programs linking community, junior and technical colleges with 4 year and graduate programs in opto-electronics and electro-mechanics

These are just some examples of areas mentioned to the project team during interviews. **It is suggested that an education survey be undertaken of employees in these industries to determine the types, forms, fields, and delivery systems that should be offered in graduate education, perhaps as a joint project of all the higher education institutions in the region**. Similar studies done in Maryland and North Carolina proved very useful in determining the degrees, fields, locations, time of day, and delivery systems needed to reach the adult worker, and part-time student.

Higher education institutions in the region must be cognizant that the way degrees and programs are delivered now might not be the preferred way to reach firms and adult workers in the future. A willingness to consider off-site locations, evening and even weekend offerings, and use of adjunct specialized

faculty, all might be considered in addition to programs for full time graduate students.

### Action 2: Institute internship and cooperative programs for students and faculty.

To reduce the out-migration of the region's college graduates and increase their awareness of career opportunities in the region, it is suggested that the region's higher education institutions re-examine and increase their emphasis on cooperative programs and internship programs with regional firms. Correspondingly, the chambers of commerce in the region and other economic development agencies must assist higher education institutions in securing firm participation in such efforts.

While cooperative programs have been primarily used in engineering, their use in other fields should be considered, including the health arena and business. Internship programs could include not only placements for students but for faculty as well, to increase their knowledge and understanding of industry, its operations, and needs.

In order to attract talent to the region, a high profile, national competitive internship program should be established. A Great Valley Fellows Program could be developed which would place students in key economic development, civic and private enterprises.

These actions, over time, could have a significant impact in reducing the out-migration of the region's talents and increasing the flow of talent into the region.

### Action 3: Establish career development/job placement services.

While there is considerable variation in breadth, depth, and services offered among the region's higher education institutions, consideration should be given to ways to increase the focus on career development and job placement in the region. It is suggested that a three-year demonstration program be undertaken whereby the region's colleges and universities would share a person whose sole responsibility would be to help place regional college graduates in regional firms. Because existing higher education career offices must focus more broadly, having the region's own representative assisting these college offices with regional placements might have a significant impact on reducing the initial out-migration of the region's talent. This might be financed by a foundation or public agency as a test of the concept. The Information Technology Institute could assist in making a regional job placement service available on the Internet and

accessible to the general population. A fee-for-service arrangement might be undertaken that could make this shared placement function self-sufficient at the end of demonstration funding.

### Action 4: Launch campaign to attract successful Great Valley natives to return to the region.

Because of the large out-migration of talent from the region over the past fifty years, many alumni of area higher education institutions have undertaken successful careers elsewhere. Some of them may either have successfully completed a career and are looking at new challenges; others might be looking for new careers or jobs.

By combining the region's alumni lists, data mining their careers and successes, a targeted list of individuals could be identified that might be interested in joining a firm, starting a firm, or encouraging their employer to consider the Great Valley as a location in which to expand. Those individuals in the information technology arena might be attracted as Fellows to the Institute, but individuals in other fields could be attracted as well.

The challenge is to undertake a comprehensive review of alumni records and develop a targeted program and execute it. Funding will be required to do this; perhaps this is something that economic development groups and organizations would be willing to support in cooperation with the region's higher education institutions.

### Action 5: Encourage college graduates to stay in the region.

A portion of the region's college graduates currently is underemployed. But if this Technology Strategy is successful, that will change very quickly. It will therefore, become important to increase the retention rate of the region's college graduates. If the region is to sell itself on its workforce and quality of life it must look at its long-term workforce supply; that is, the future pipeline and not just the current pipeline.

Furthermore, because of rapid changes in technology, and expected career and employer changes by young graduates, it is important that the region have in place the kinds of lifelong learning opportunities for the existing workforce to upgrade skills, learn how to use new technologies, and keep their skills competitive. The Information Technology Institute can play a significant role in helping the existing workforce adapt to and use information technologies, regardless of a person's career, job, or employer.

It is not easy to change the self-image in a region where generations of families have primarily worked with their hands, not minds. Further, there are too many examples of where a college education has simply meant the further loosening of strong extended family ties, an important part of the region's culture and strength. Ideally, if the region's economy begins to change, and if better and more well paying jobs become available to local graduates in the region, role models will emerge who can help change this image. But it will take time.

In the meantime, a public education campaign is going to be vitally important. The focus should not be to educate the outside world about Scranton, although this is important and should be dealt with later. Rather, the focus should be to educate Great Valley about itself. For example, it should showcase local graduates who have stayed and been successful, as well as graduates who have come back and become successful. This "branding" campaign, stressing the importance of education, could be a joint effort of higher education institutions and the local business community.

Interestingly, the members of the current workforce, including the underemployed, do not always take advantage of educational offerings of their employers. Many of the new operations in the region provide total or substantial tuition reimbursement to their employees to pursue part-time education. Many of the employers we interviewed were surprised at how few of their employees took advantage of this benefit. While this may be due in part to frustrations about underemployment, it may also be that higher education institutions must become much more aggressive in reaching out to the adult worker as a part-time student, through open houses, mailers, videos and other means.

Lifetime earnings for graduates of college are $450,000 higher and each graduate degree adds another $300,000 to this figure. Parents, grandparents, and adult workers need to know this and be educated about the advantages of lifelong learning. It will be to both their benefit and that of Great Valley.

## Enhancement of Quality of Life Strategy

### Maintain and improve the region's quality of life and amenities

Great Valley is rich in outdoor recreation opportunities and has a wonderful natural landscape. The region also has made strategic investments in new sports facilities and recreational attractions. Despite these advantages, the region suffers from a deficit in terms of the kinds of amenities which younger knowledge workers demand – loft-like or studio apartment rental housing, coffee shops, outdoor cafes, gallery spaces, health clubs, and restaurants. The region does have two major downtown areas that could be adapted to be more attractive to young, technical workers. The region should develop

an amenity strategy designed to leverage its significant market of college age students to develop downtowns that will be attractive to young knowledge workers.

### Action 1: Develop an amenities strategy linked to the knowledge economy.

The region has some distinct advantages. Its two major downtown areas are compact and walkable and feature and have a significant stock of older, historic buildings that can be adapted to other uses. These downtown areas also benefit from relatively large adjacent college and university populations that provide a natural market for the amenities desired by young professionals. By utilizing this market of college age students to leverage investment, amenities might be offered that would then further attract knowledge workers in slightly older age groups. Such a strategy has been used successfully in places like Portsmouth, New Hampshire; Portland, Maine; and New Brunswick, New Jersey. These places have made significant public investments in outdoor recreational infrastructure – such as bike paths, accessible parks and accessibility to water for rowing and sailing. Each of these regions makes strategic use of their water resources as an amenity and has undertaken investments to ensure that water is accessible.

The region must develop an amenity strategy and link it in a consistent fashion to its emerging economic development and knowledge-based efforts as outlined elsewhere in this report. The region's amenity strategy must focus on the outdoor, recreational and lifestyle amenities including a focus on downtown revitalization. Amenities are a critical piece of the total package sought by young, technology-oriented talent. The nation's high tech regions are amenity-rich regions. That – along with good, challenging, high-reward jobs – is a large part of the reason why they are winning the competition for high technology talent. Jobs are a necessary but insufficient condition in this battle for talent. Amenities complete the picture. An amenity strategy is relatively inexpensive and involves mobilizing resources of a region. It is place-based and its benefits are not just for high technology workers but for all residents of the region. Taking advantage of your rivers, waterways, forests, and mountains in ways that enable citizens to enjoy and use them builds on why cities were created around waterways in the first place.

### Action 2: Facilitate the creation of a young professionals' organization.

The region should provide funding or other assistance so as to catalyze the creation of a young professionals' organization, like the Pittsburgh Urban Magnet Project (PUMP). This can provide a vehicle for integrating young professionals'

input into key activities and for sponsoring downtown-oriented events such as weekly music series.

Young knowledge workers are looking for places they can readily "plug-into" and develop a support structure of colleagues and friends. This is particularly important for new residents to the region who do not have the support structure of friends and family.

### Action 3: Develop a partnership between colleges and universities and the cities of Scranton and Wilkes-Barre to create an environment attractive to young professionals.

The region should engage in a coordinated thrust which links its downtown colleges and universities, businesses, economic development agencies and others in a joint effort, with city governments, to continue efforts already underway for downtown revitalization. These efforts should be continued and expanded because since the New Economy tends to involve a seamless mixing of work and leisure, amenities need to be close to work, not located within a one to two-hours drive. A strategy should be developed to attract to the downtown areas the types of amenities desired by young professionals including restaurants, music venues, and nightlife options.

### Action 4: Develop outdoor activities of interest to young knowledge workers.

The region should seek to develop outdoor activities, such as rowing, road and mountain biking, and rock climbing that appeal to young knowledge workers. Such activities could also be marketed in the New York and Philadelphia metropolitan areas. The attraction of major regional and national competitions, such as a mountain biking race or snowboard competition could also be used to market the region's recreational assets.

## Industry Assistance Strategy

### Assist Great Valley industry to develop and use advanced technologies

Great Valley has a broad set of manufacturers and services firms but they are not particularly specialized nor do they always use technology to improve and maintain their competitiveness.

**Manufacturing Base.** The manufacturing base is extremely diversified and, except in a few areas, there are only a few manufacturers in each subsector. Manufacturing employment has fallen by 10,700 jobs in the 1989-98 period. Thirteen of twenty

industries shed workers between 1989-98. Most of the region's traditional industries declined at rates significantly higher than the national average for their industry. Among the seven manufacturing sectors to add employment over the period, most notable are two technology intensive industries: electronic and other electrical equipment and instruments and related products. Growth in both industries appears to be well out-pacing national averages (both industries declined at the national level in this time period).

**Emerging Services Base.** The region is clearly going through a transition from an industrial, manufacturing base towards an information-driven economy, in the region's case to one focused on the services industry, a trend that parallels economic shifts occurring nationwide. The region still remains slightly more manufacturing intensive than the U.S. as a whole. The region experienced a growth in services by 21.6% in the 1989-96 period, driven mainly by employment growth in health services, education, social services and membership organizations, and business services (including call centers). However, even then none of the major services industries in the region grew as rapidly as their national counterparts. In short, while the services industry accounted for most new jobs in the region between 1989-96, Great Valley is not increasing its competitiveness in the service industries. Technology adoption and adaptation might help improve the prospects of certain key existing industries in the region.

**Emerging Industries and Clusters: A Mix of Services and Manufacturing.** The region's manufacturing base has subsectors upon which to build, such as health services (including laboratories and hospitals), electronics and instruments, and transportation services, shipping and logistics. The sheer size and concentration of health-related activity suggests the opportunity to develop more "exportable services." In the case of transportation logistics, the region possesses strategic location vis-à-vis major markets in the eastern U.S. With the growth of Internet commerce and just-in-time inventory and delivery systems, shipping and logistics have become increasingly technology-intensive industries. In terms of electronics and instruments, while the sector is not large, it is growing, with a few firms accounting for most of the activity. Finally, printing and publishing stands out as a relative strength of the region.

The performance of several traditional core specializations in the region appears to have been modest at best. On the other hand, it appears that new, smaller sectors are emerging as potential future growth engines of the region: trucking and warehousing, financial institutions, insurance, and certain advanced manufacturing industries such as electronic equipment and instruments.

The *Regional Economic Analysis Report* identified parts of a "New Economy" emerging in the region where knowledge intensive clusters including securities and insurance, legal and real estate, and transportation services, shipping and logistics are doing well. The *Economic Analysis* also shows the potential of the region to move certain sectors upward including software, engineering and communications services; and electrical

communications measuring and navigation equipment. Software and communications services had strong startup activity.

Great Valley's future economy will be a mix of traditional, but modernized, manufacturing and service industries working in much different ways than the past. The region has a number of emerging areas on which to build its future. But to accomplish this it must undertake a set of concerted strategies and concrete actions to overcome current problems and gaps.

The current economic base of Great Valley remains isolated and disconnected. Firms are isolated from each other — as buyers and sellers — and disconnected. They need to take advantage of each other's capabilities, whether in R & D, production, distribution, or marketing. The Battelle Team's interviews found a great amount of enthusiasm for and thirst for ways for firms to better "network" with each other and to connect with business service providers, experts, and the knowledge workers and thinkers of the future. Great Valley's culture traditionally has been competitive and antagonistic. Team building across and within firms will be the hallmark of competitive firms and competitive regional economies in the future.

Technologies, particularly information technologies, can be used and applied by manufacturing and service industries to become more competitive. Firms in Great Valley can undertake greater efforts to buy and sell to each other as well as globally. But the best way to encourage this is to create an environment for collaboration and cooperation, from which such teaming will occur.

### Action 1: Develop a Manufacturing Technology Network.

It is imperative that CEOs and others working in advanced manufacturing have the opportunity to meet one another; to learn of each other's interests and capabilities; and to become aware of external resources including service providers and education institutions that are available to help meet their needs. A Manufacturing Technology Network should be formed to build stronger linkages among manufacturers; to identify and capture spin-off entrepreneurship opportunities from existing firms; and to help firms better identify and use technology to modernize and improve their competitiveness.

Participation in a manufacturing network can help manufacturers to move out of their "silos" and encourage them to better leverage their existing capabilities to grow new industries. Common issues that could be addressed by the network include: addressing common workforce needs, identifying and filling gaps in local supplier chains, and identifying ways to increase sales within the region. The Network could also help to increase awareness of successful role models and successful innovative practices by manufacturers in the region.

## Action 2: Assess technology needs of emerging clusters including health care and logistics.

The *Regional Economic Analysis Report* found that trucking and warehousing was one of the strong growth industries in Great Valley. Because this industry is moving towards information/Internet driven logistics management, one area upon which to build a stronger value chain of activities is to determine whether the region and its higher education institutions might partner to build a national center in transportation logistics. Such a center could partner with an existing center at Penn State University, and provide the "applications" component.

A related alternative is to assess whether Great Valley's location could provide the basis for building and attracting finishing/final assembly facilities dependent on rapid turnaround manufacturing. This would again build on the region's strengths in transportation and distribution but make the "value chain" deeper, with the potential to create additional jobs.

## Exhibit 2: Key Trends in Advanced Logistics and Distribution

A variety of emerging trends are affecting the nature of manufacturing industries and the ability of regions to develop and retain competitive advantage as centers for manufacturing, as well as other related economic activities. The combination of these trends makes logistics and distribution a critical – but largely unrecognized - element of a technology-oriented regional strategy. According to recent estimates, logistics is a $800 billion industry (four-fifths the size of the $1 trillion health care sector) and it is growing rapidly.

Logistics is a technology intensive industry with considerable ramifications for regional and national competitiveness. Once a low-tech, "pedestrian "industry, logistics and distribution is now extremely technology intensive. Modern logistics represents the use of information technology and advanced satellite systems to create information rich transportation and distribution systems. Goods flow seamlessly from order to shipment and delivery on trucks guided by computer and GPS systems. Downtime is eliminated as for example, new drivers meet trucks at designated hand-off spots. Orders move from customer to factory and supplier, then to plane, ship or truck in seamless, continuous fashion. Speed and time are the critical elements of success.

Excellence in logistics and distribution is a key factor in gaining competitive advantage. Recent research by university teams and the Council of Logistics Management found that firms with established excellence in logistics gained significant competitive advantage in efficiency, effectiveness and flexibility. In fact, logistics and the management of global supply infrastructure appear to be supplanting manufacturing performance as the key to competitiveness in both traditional and high-tech manufacturing industries.

Logistics and distribution is moving far beyond the traditional truck based delivery systems. Companies are striving to eliminate inventory, reduce time, and overcome barriers from order to production, shipment, and delivery. Companies such as IBM are moving to "global enterprise integration," integrating key functions such as production, sourcing, conversion, distribution, and after-sales support on a worldwide basis. The most advanced firms are moving to "market channel integration," developing systems to integrate the entire value chain from raw materials to customers, building integrated virtual enterprises with common systems and infrastructure. Examples include Wal-Mart's use of vendors to manage inventory, Dell's innovations in delivery systems, and Xerox and Hewlett Packard in after-sales service. **The most competitive regions will be those that provide the infrastructure that enables companies to efficiently achieve such logistic integration.**

Logistics is no longer handled in-house but through partnerships and outsourcing. A growing number of companies, such as Sun Microsystems, are developing "turnkey models" for logistic management, in effect turning over the management of their supply and distribution channels to third party providers. Companies such as Pittsburgh–based FreeMarkets is establishing Internet based auction tools for managing supply transactions for companies such as United Technologies as well as government clients.

These trends have combined to make logistics and distribution an ever more important component of firm and regional competitiveness.

# Realizing the Vision: Requirements for Success

If the vision laid out in this strategy is achieved, Great Valley's "New Economy" will provide good, well paying jobs that employ all of the region's graduates as well as attract talent to the region. The region's quality of life will continue to improve, aided by efforts to further address components of its technology infrastructure such as air and rail service. Entrepreneurial businesses will emerge from the region's incubators and accelerators, and the region will support a diversified economy using and applying information technologies to serve global and local markets. Unemployment levels will be below those of both the state and nation and the region will be known for its quality of life – good schools, strong communities, and recreation and cultural opportunities.

But in order to achieve this vision, a variety of opportunities must be seized and addressed. These include:

- **Attitudes.** Poor self-image and an acknowledged inferiority complex by the communities and its residents must be overcome. Other areas, such as New England, Cleveland, and North Carolina, have successfully changed both the attitudes of residents and consequently the region's image. **A positive, pro-active view of the community, its attributes and its future are necessary to build a knowledge-based economy.** Advanced manufacturing and technology workers have many choices and most of these choices include living in communities that are bullish about their future prospects. There must be a group of community champions for this view, and community institutions must be willing to support and help the community grow, rather than simply complain about decline and the past.

- **Risk-Taking.** It is not surprising that there is aversion to risk in Great Valley. Having gone through two major economic transitions already – coal and the needle trades – those remaining have focused on job security as the most important item in their lives. **But Great Valley has shown more success in the post-WWII period than many of its residents want to acknowledge. Its economy has diversified, and new industries are emerging.** But technological obsolescence is raising its ugly head for the third time with the result that the region can again be left behind if it does not adapt and take a risk on its future. It must have "champions" in the community who are willing to share risks – investing their dollars in risky ventures; using their good will to propose and support projects to bring communities and citizenry together. An "entrepreneurial risk taking" mindset must pervade the region's public and private leadership and those community institutions that are critical to informing and educating the public.

- **Regional Cooperation.** Fighting and arguing over who did what to whom and assuming the size of the pie is static and that there are only winners and losers – both approaches that seem to pervade public discourse in the region – will get Great

Valley nowhere in the long term. If the region wants to keep its young people and see them stay and raise families, with good jobs and a good quality of life, then Great Valley must learn from others. No region can hide from or withdraw from the global economy, except at its own peril. Companies are increasingly international and so are their employees' careers and jobs. New York and Philadelphia are only a short jump away but in some sectors of the region it seems like Great Valley is millions of miles away from these international centers. **Regional leadership needs to start an Ambassadors Program to enable the communities' leadership to visit and compare what is done in Great Valley with other regions**. This is something many progressive cities now do.

- **Stop the Outflow of the Young and Educated and Attract Young Talent.** Unless a greater proportion of the region's young, more educated graduates and workers stay in the region, and the region is able to attract new talent to it, the region will not be able to "leap frog" its economic development to more high valued add job opportunities. Because of 50 years of out-migration, the region suffers from not having a sufficient number of successful entrepreneurs growing their businesses locally into larger firms and attracting and expanding the high value end of firms' products and functions to the region.

These obstacles must be overcome for the region to grow economically and technologically.

# Implementation Plan

To succeed in implementing the strategies and actions outlined above will require taking the following steps.

## Recruit New Leaders

**Implementation Plan**

- Recruit New Leaders
- Establish Great Valley Regional Collaborative
- Initiate image campaign
- Build consensus and a shared vision of the region's future
- Obtain resources
- Focus on priorities
- Measure progress

As a result of the region's successes in diversifying its economic base as well as changes in national and international economies, new industries and new leaders are emerging in Great Valley. Many of these leaders have lived elsewhere in the U.S. and abroad. Many are new to Great Valley but they also are the region's most enthusiastic cheerleaders. Many have been successful in their careers and professional lives and want to contribute to the community. They are positive about Great Valley and want to help the region to grow.

Yet, Great Valley's leadership, at least on paper, is too often represented by leaders, many retired, of its "old economy" rather than its emerging "New Economy." This is unfortunate because many of the new leaders in industry, the non-profit sector, higher education and elsewhere, want to help build a brighter future for Great Valley.

Organizations like the Greater Scranton Chamber of Commerce and the Greater Wilkes-Barre Chamber of Business and Industry have begun to involve such emerging future leaders on their boards and in their various programs and activities. But too much of the leadership and vision for Great Valley is dependent on its public sector leaders. Such leaders have indeed been most responsive to and want to engage in greater private-public partnerships. But they too have been limited by the fragmented landscape of groups and organizations, fragmented local government, and a history of mistrust of the public sector by its citizenry.

It is incumbent on the region to build its future generation of leaders — particularly from the private sector — and involve them now in taking advantage of the various visioning projects already completed in the region, and begin a move to action, both short and long term. New "champions " for Great Valley are critical to accomplishing the strategies laid out in this report. Such leaders need to be drawn from industry, the philanthropic and non-profit communities, government, industry, and higher education. And they must work through a non-partisan and objective organization respected and supported by the citizenry of Great Valley.

## Establish Great Valley Regional Collaborative

Champions of a technology agenda are going to be essential to implement what will be a long-term effort to build a knowledge economy in Great Valley. This requires "networking" resources across industry, government and higher education sectors. The Collaborative will operate under the principles of the New Economy, e.g., serving as a "connecting" organization, linking and building networks and a consensus on the region's vision and future. Such visioning only happens by having such a "blue-ribbon" body recognized as concerned about the long-term future of the region. Such organizations abstain from and resist intrusion into short-term, local political debates and strategically focus on the important, larger, critical issues for the region's economy.

Great Valley needs to create the Great Valley Regional Collaborative to play this role. Funding will need to be obtained, primarily from private and philanthropic sources in the range of $300-500,000, excluding funding for programs, for the core operations of the Collaborative. A five-year strategy needs to be developed focusing on key priorities such as those laid out in this set of strategies. The Great Valley Collaborative can strategically support and invest in various economic development groups and organizations to implement these priorities, with the Collaborative's role being primarily one of catalyst and broker, not operator of programs.

## Initiate Image Campaign to Promote Great Valley

The development of a new name for the region, Great Valley, tells the world that the Scranton, Wilkes-Barre, Hazleton and the other communities of Pennsylvania's Northeast region are not going to be left behind in the nation's technological revolution. But for this to be "real" it requires more than just that the region's economic development ambassadors say so. It requires all the region's citizens to be ambassadors to their children, grandchildren, friends and neighbors, here and outside the region. A positive campaign about the region's assets – its educated workers, its work ethic, its community pride, its resiliency in face of major economic dislocations – can tell the world about the sense of pride and ownership found in Great Valley. This pride expresses itself in its young people staying in the region to work and raise a family. It expresses itself in community leaders speaking in both spirit and with personal financial commitments to investing in the region and its future.

The **Great Valley Knowledge Campaign** first needs to inform and educate the region before venturing outside the region. Its goal should be to build regional pride attitudinally and organizationally. And the image campaign includes "re-branding" the region not for its low costs of operations but for its workforce availability and quality of life. Recruiting based on quality of life and quality of workforce is going to be

necessary. The campaign can help educate the citizenry on the need to attract and keep its young talent.

One of the first jobs of the Great Valley Regional Collaborative should be to secure funding and support to mount this campaign in the region, enlisting community leaders and institutions including media -- print, television, radio, Internet/web – and community groups and organizations. A speaker's bureau should be created and regional leaders should be engaged to serve as "champions" for this effort. Marketing materials and an Internet web site called "Great Valley Pride" should be developed to educate and inform people of all ages on Great Valley's "New Economy" and their role in it.

A minimum budget of $250,000 is needed for the in-region campaign to be followed by a multi-million dollar five-year national image campaign in later years. Advertising agencies, industry and others should provide in-kind and cash support for this effort. Community leaders will serve as ambassadors – both telling the Great Valley story—and learning of what is happening in other communities and using this to constantly revise and update this set of strategies.

## Build Consensus and a Shared Vision of Region's Future

As an outgrowth of the image campaign, the Great Valley Regional Collaborative, working with other economic development groups and organizations, should work to build consensus on a shared vision of the future of Great Valley. It is important that a vision be adopted around which all interests in the region, including business and economic leaders, mayors, community organizations and neighborhoods, can work cooperatively to make positive change happen. The Great Valley Collaborative may want to provide opportunities for residents of Great Valley to share their viewpoints on the region's future by means of web-sites and e-mail.

Business and civic leaders need to become engaged in a process of study, reflection and selection. Out of this consensus building, a selective recruitment strategy, to complement the entrepreneurial and existing industry strategies laid out earlier can be established. This strategy might likely focus on the new media industry in New York City and New Jersey and the information technologies industries (services) in the Washington, D.C. area. There may also be opportunities in logistics, GIS, health, electronics, and printing and publishing. Most importantly, the development of consensus on what the region's future economy should look like, will help insure that local economic development efforts are targeted for the long term, because such efforts, as demonstrated by the success of Great Valley's manufacturing diversification strategy of post-WW II, take many years to achieve fruition.

## Obtain Resources to Implement Strategies

Implementing these strategies will require identifying and securing substantial resources from the following sources:

- **Private:** Firms in the region recognize it is in their self-interest to continue to help strengthen the community. Their financial and personal contributions to this effort, including both their time and investment of resources, will be needed to help implement the actions laid out in this report.

- **Higher education:** Because of the critical importance of higher education to the region's long term knowledge economy, educators can contribute through time, facility use, and support of the actions in this report.

- **Public sector:** Local and state elected officials can use this set of strategies as a road map to the types and kinds of investments they can help make to build the region's future economy. The region has successfully obtained federal funding and support to build its travel and tourist industries and to assist individual colleges and universities in various ways. It is suggested that in the future the region's federal and state legislators be encouraged to give strong focus to federal and state investments that help build a knowledge-based economy for the future growth of the region.

- **Non-profit and philanthropic communities:** Many of the region's champions and catalysts to make these strategies a reality will emerge from the non-profit and charitable sectors. They can serve as respected brokers and facilitators to encourage the necessary actions and investments that will guide the region's future. In deed as well as words they can make sure their organizations and institutions begin to act and work regionally, solving both their problems and those of the broader community.

The Great Valley Regional Collaborative will need to play a key role, through its blue ribbon committees, in raising and sustaining support for the priorities and programs that will over the long term create Great Valley's future.

## Focus on Priorities

There are certain key priorities among the many strategies and actions laid out in this document. Table 6 summarizes the priority strategies and actions.

| Table 6. Overall Priorities |
|---|
| Establish Great Valley Regional Collaborative |
| Establish Great Valley Information Technology Institute |
| Create an Angel and Mentoring Network and Great Valley Innovation Fund |
| Initiate programs, such as internships and cooperative programs, to retain college graduates in the region |
| Undertake marketing campaign |
| Initiate Amenities Strategies for Region's downtowns |

## Measure Progress

The Great Valley Collaborative should develop a system to track progress in achieving its strategy and programs goals. Regular performance assessments are needed to determine which policies and programs are most effective and to identify changes that may be required. Tracking outcome measures requires the establishment of initial baseline data so that changes can be tracked over time. Measures of success that could be tracked include:

- Percentage of the region's workforce in information technology occupations compared to the region's 1999 percentage;
- Increase in level of R&D conducted within the region;
- Increase in graduate program offerings;
- Increase in venture capital investments;
- Startup rate of firms greater than U.S. average in key industries and death rate lower (over 1999 baseline);
- Percentage of college graduates staying in region after graduation;
- Percentage of population with college degree;
- Unemployment rate below national average (# of months per year); and
- Quality of life as perceived by residents (Customer satisfaction survey).

# Conclusion

The Great Valley is poised to recast its economy, its destiny and future. In this New Economy the focus will be on investing in people – not just attracting and recruiting firms. Skilled knowledge workers will create the industries of the future. Existing industries can become technology-driven, adapting what and how they make things, based on using and applying technologies. Building a stronger technology infrastructure including the attributes of a graduate higher education and applied research base is critical to the region's full participation in the New Economy of the future.

If the region does not overcome its weaknesses and build on its strengths, it is likely to face again a situation of technological obsolescence, as occurred with the heavy industry of the past and the apparel industry of more recent time. Its base in low cost operations such as call centers and data processing centers may be eclipsed by a worldwide virtual economy where the Internet and electronic commerce take away the region's low cost advantages. **Rather than waiting for this to happen, the region and its leaders need to build on its strengths — its colleges and universities, the work ethic of its employees, and its quality of life — to continue to grow a New Economy grounded on the diversified base it has already successfully established.**

This technology strategy for Great Valley is predicated on and requires the ability of the region's citizens to accept, welcome, and incorporate change as a matter of normal course. It seeks to build on the strengths of the region but it also takes into account threats — from worldwide competition to product obsolescence — and new opportunities that the digital age and the New Economy offer.

Change is required if the economic future of the region is to be brighter for the region's sons and daughters and grandsons and granddaughters. It has been a long time since the region's citizens could say to their children "You do not have to look elsewhere for a good job and good pay." Achieving the vision outlined in this strategy will make Great Valley a region that not only keeps its residents and their children but attracts talent from throughout the U.S. and the world. It will not be easy to accomplish but it is not impossible. It will require a willingness to change, to try new things, and, most of all, to work together to achieve a common regional economic future.

# Appendix

## List of Interviewees and Focus Group Participants

Heather Acker
CFO
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# Endnotes

[1] Information technology industries include companies in the following classifications: computer equipment, communications equipment, software and data processing communications services, wiring and wiring devices, communications wholesale and repair, and electronic components.
[2] A consensus definition of "high technology" does not exist. These data are based on a definition developed by the Bureau of Labor Statistics. Average payroll per employee was calculated using data from County Business Patterns. *Monthly Labor Review*, June 1999.
[3] The Emerging Digital Economy, p. 7.
[4] This industry is made up of some 300 establishments employing 5100 workers and generating $155 million in wage payments annually. The sector added 720 jobs between 1989 and 98, for an annualized growth of 1.8%. By comparison, the trucking and warehousing industry nationwide grew by a quarter of a percent annually between 1989 and 1996.
[5] Ross C. DeVol. *America's High-Tech Economy*. Santa Monica, CA: Milken Institute, 1999.
[6] US Bureau of the Census.
[7] The Computer Collaborative, a program of Skills in Scranton, in cooperation with the Greater Wilkes-Barre chamber of Business and Industry, was instituted to address the employment needs of Northeastern Pennsylvania's computer-using organizations by creating a forum of communication between business and education. More than 50 area businesses and 12 institutions of higher learning in Lackawanna and Luzerne Counties participate in the Collaborative.
[8] David Birch, Anny Haggerty and William Parsons. *Entrepreneurial Hot Spots: The Best Places in America to Start and Grow a Company*. Cambridge, MA: Cognetcs, Inc., 1998, p. 28.
[9] Ibid., p. 10.
[10] Information technology industries includes companies in the following classifications: computer equipment, communications equipment, software and data processing, communications services, wiring and wiring devices, communications wholesale and repair, and electronic components.