



*Research to drive informed decisions.
Expertise to create effective solutions.*

GROWING THE ECONOMY IN THE GREATER ROCHESTER REGION

DRAWING ON THE COMPETENCIES OF THE FINGER LAKES

Prepared for:
Finger Lakes Wired

Stephen M. Mitchell, PhD
Project Director

One South Washington Street
Suite 400
Rochester, NY 14614
Phone: (585) 325-6360
Fax: (585) 325-2612

100 State Street
Suite 930
Albany, NY 12207
Phone: (518) 432-9428
Fax: (518) 432-9489

www.cgr.org

August, 2007

© Copyright CGR Inc. 2007 All Rights Reserved

GROWING THE ECONOMY IN THE GREATER ROCHESTER REGION

DRAWING ON THE COMPETENCIES OF THE FINGER LAKES

August, 2007

SUMMARY

The Center for Governmental Research (CGR) was engaged to identify the key competencies of the Finger Lakes region and make recommendations to Finger Lakes Wired on strategies to capitalize on these competencies for the expansion of the region's economy.

Project Elements

CGR reviewed and consolidated elements from a number of sources, including a series of focus groups with leaders of businesses identified by various means as particularly successful. The focus groups and interviews were particularly important as they added the “texture” of day-to-day experience to the bare statistics. The statistics may tell us *what* happened—such as employment and payroll trends—but not *how* or *why*.

The first step in CGR's work was a review of the analyses completed by New Economy Strategies (NES), Center for Integrated Manufacturing Studies (CIMS), and Greater Rochester Enterprise (GRE).

Second, we analyzed the Rochester Top 100 lists from the previous ten years, a compilation of conspicuously successful private firms across the full range of business sectors. CGR identified the companies that have frequently appeared in the Rochester Top 100 and analyzed these companies using several different criteria.

With the help of GRE and HTR, CGR identified six sectors within which to convene focus groups: Information Technology (IT), Advanced Manufacturing, Optics/Imaging, Biomedical, Service, and Agribusiness. After adding successful public

companies, CGR identified and invited the leaders of 160 different firms in the greater Rochester region to participate in sector-based discussions. About one quarter of these leaders participated, giving generously of their time.

Findings

The benchmark of success in today's dynamic global marketplace is flexible management. We conclude that while **technical competencies**—information and communication technology, optics/imaging and others—are important to the success of many Finger Lakes firms, it is **management competencies** that set the outstanding companies apart from the rest. Also important—and the particular responsibility of economic development initiatives—are **enabling competencies**, competencies that encourage the dissemination of both management and technical competencies and encourage the growth of the region as a whole.

No Unique Competitive Advantage?

Some may find this conclusion disappointing, hoping that CGR would identify a unique technical competency that sets the Finger Lakes region apart from its global competitors, granting the region some distinct competitive advantage. We see this differently: As is amply demonstrated by the diversity of the region's successful companies, the Finger Lakes can be globally competitive in a wide variety of technologies, products and services. This diversity has supported the regional economy even as the market of its most prominent economic engine—the Eastman Kodak Company—has nearly disappeared and with it, the need for tens of thousands of skilled workers. This diverse economic base will preserve the stability and prosperity of the Greater Rochester region for decades to come.

Economic Strategy Must be Deep AND Broad

CGR's report concludes with a series of recommendations on strategic initiatives that will strengthen key competencies, particularly the critical management competencies. Unlike a focus on a single technical competency, however, these recommendations address the broad range of activities that support the diversity of business in the region.

Workforce development—the centerpiece of the Wired collaborative—must also be the centerpiece of the community’s economic development strategy, although the “workforce” includes the managers and entrepreneurs just as much as the employees on the shop floor, in the office, or in the laboratory.

Build on Existing Initiatives

Few of CGR’s recommendations are new and none are uniquely ours. We have drawn on the recommendations of national experts as well as the experts and institutional priorities from within the region.

In today’s global marketplace, an effective economic development program has many elements, most of which will require ongoing collaboration, tenacious execution, and a significant financial commitment from the private sector and the public sector at all levels. The Greater Rochester region is endowed with effective institutions in the public and private sectors that support economic development. The competent and dedicated professionals who work in these entities will find no surprises among our recommendations—particularly as many of the recommendations support initiatives that have been in place for many years or are already in the planning stages.

***NOTE:** Some existing initiatives and institutions are mentioned in the text for purposes of illustration. These citations are not intended to serve as a complete listing of programs in place or institutions providing particular services. An asset inventory is being compiled and will be made available in a web-searchable form during the fall of 2007.*

TABLE OF CONTENTS

Summary	i
Project Elements	i
Findings.....	ii
No Unique Competitive Advantage?	ii
Economic Strategy Must be Deep AND Broad.....	ii
Build on Existing Initiatives	iii
Table of Contents	iv
Acknowledgments	viii
Introduction	1
Background and Rationale	2
New Business Model	2
Technology Drives Convergence of Sectors & Markets	2
Sector-Based Strategies Fall Short	2
Wired's Purpose	2
Core Competencies	3
Clusters Driven by Competencies	3
Competencies Drive Competitiveness	4
The Age of Specialty Economies Has Ended.....	4
Management Competencies Make the Critical Difference	4
Key Technical Competencies Enable Broad Economic Expansion	4
Enabling Competencies.....	5
Management Competencies.....	5
Competency 1: Systems & process integration	6
Competency 2: Strategic sensibility	6
Competency 3: Customer responsiveness	6
Competency 4: Talent identification and development	6
Competency 5: Quality and operational excellence	6
Competency 6: Entrepreneurial ethos.....	6
Technical Competencies.....	6

Competency 7: Information & communications technology.....	7
Competency 8: Optics and imaging	7
Competency 9: Biomedical research	7
Competency 10: Agribusiness/Food Processing	7
Enabling Competencies	8
Competency 11: Translational science	8
Competency 12: Business network creation and nurturing.....	8
Competency 13: Business service support network.....	8
Recommendations	9
Premises.....	10
Recommendations for Developing Management Competencies	11
Recommendations for Developing Technical Competencies	12
Promoting Enabling Competencies	20
Other Issues Raised in CGR's Forums.....	23
Promote Competitive Business Climate.....	23
Regional Coordination and Accountability	23
Explore Improved Metrics for Regional Vitality	23
Conclusion	24
Appendix	25
Methodology	25
The Challenge of Describing Competencies Using Reported Labor Statistics	25
North American Industry Classification System (NAICS).....	25
Location Quotients	26
Profitability and Growth.....	27
CGR's Approach to Capturing Competencies	27
Step 1: Summarize Key Findings of NES, CIMS and GRE Analyses	28
Step 2: Identify Successful Businesses	28
Step 3: Convene Executives of Successful Businesses to Identify Competencies	29
Step Four: Identify core competencies of the region and provide	
recommendations for continued success	30
Forums with Successful Firms.....	31
Company Background.....	31
Observations	31
Key Insight: Sectors Labels Have Limited Value	31
Key Insight: Successful Firms Have Common Growth Strategies	32
Strategy One: Diversify application, geographic market, and/or service	32
Strategy Two: Build growth on key technology	32
Strategy Three: Identify niche/boutique markets	32
Strategy Four: Emphasize customer service and/or quality	33
Key Insight: Systems/Process Expertise is a Core Competency.....	33
Identifying Competitive Advantage	33

Define Success Around Customer Need.....	33
Recognize Core Competency Within Firm	34
Technology is One (but not only) Source of Competitive Advantage	34
Quality/Operational Excellence Sets Successful Companies Apart	35
Strategic Sensibility Critical to Success	35
Supporting Competitive Advantage	35
Workforce	36
Technology	36
Organizational Design	37
Connections	37
Innovation.....	38
Business Challenges	39
Workforce	39
Operations	40
Markets.....	40
Business Climate.....	41
Talent	41
Availability of talent.....	42
Good Local Supply	42
Local Colleges and Universities.....	42
Human Resource Investment	43
Hiring for Fit.....	43
Workforce Challenges: Supply and Wages.....	44
Recruiting to Rochester	45
Skills Gaps.....	46
Investing in Training	47
Talent Pipeline.....	48
Game-Boy Generation	49
Other Comments From Forum Participants	50
Strategic Focus	50
Global Marketing.....	50
Entrepreneurship	51
Establishing Metrics.....	51
Workforce: Creating a Talent Pipeline.....	52
Focus on Secondary Schools	52
Launch a Broad Public Relations Initiative	52
Improve Connections with the Region’s Colleges and Universities.....	52
Other Issues.....	53
Marketing the Region	53
Business Climate.....	54
Leadership	54
Participating Companies and Entities.....	56
Prioritizing the Recommendations	57

Concepts to Consider in Prioritizing Recommendations	57
CGR's Suggested Priority Recommendations	58
Center for Integrated Manufacturing Studies (CIMS) Survey Analysis	61
Analysis of the Four-Cluster Data	62
Competitive Advantage and Disadvantage	62
Differences by Revenue per Employee	63
Differences by Profit Performance	63
Differences by Cluster	63
Customers and Suppliers	64
Differences by Profit Performance	64
Differences by Cluster	65
Management Practices	65
Differences by Revenue per employee	65
Differences by Cluster	66
Human Capital	66
Differences by Revenue per Employee	66
Differences by Profit Performance	66
Differences by Cluster	67
Innovation	67
Differences by Revenue per Employee	67
Differences by Profit Performance	68
Differences by Cluster	68
Collaboration	69
Differences by Revenue per Employee	69
Differences by Profit Performance	69
Differences by Cluster	69
Comparisons of Current Wired Activities to CGR's Recommendations	73

ACKNOWLEDGMENTS

CGR extends its deepest appreciation to the business leaders who took time away from their firms to participate in this research. The group is deeply committed to the Finger Lakes region. CGR hopes we have done them justice both in our attempt to capture their “lessons learned” and to translate those lessons into recommendations for regional economic and workforce development strategies that will support their and other regional companies’ success.

CGR wants to thank the Greater Rochester Enterprise (GRE), High Tech Rochester (HTR), New York Photonics, and the New York State Agricultural Experiment Station for helping to identify successful firms as candidates to participate in this study. We also want to express our gratitude to the Rochester Institute of Technology’s Center for Integrated Manufacturing Studies for sharing and allowing us to reanalyze survey data that they had collected during their Roadmap Project.

Finally, we want to thank the Finger Lakes Wired for giving CGR the opportunity to conduct this study.

Staff Team

Stephen M. Mitchell, PhD, served as project director. He had primary responsibility for framing the research study, conducting the business forums, and preparing the draft report.

Rochelle Ruffer, PhD, had primary responsibility for the reanalysis of the CIMS data and the analysis of the Rochester Top 100. She also played a major role in ensuring the readability and integrity of the final report.

Scott Sittig worked with Rochelle on the reanalysis of the CIMS data and the analysis of the Rochester TOP 100, and with Steve in

conducting the forums. He also assisted in the preparation of the draft report.

Kent Gardner, PhD, provided guidance and direction, and ensured that the research and report were up to CGR standards of quality and practicality.

Sergey Zinger assisted in the CIMS analysis, while David Landry was responsible for the smooth operation of the business forums.

INTRODUCTION

This report summarizes the results of research performed by the Center for Governmental Research (CGR)* under contract to Finger Lakes Wired. In its research, CGR sought data to support and provide direction or “next steps” in moving the Wired initiative forward through a set of economic and workforce development strategies that take advantage of the region’s competencies—business areas in which the Finger Lakes region demonstrates a competitive advantage. In doing so, CGR identified competencies and developed recommendations for actions that will take advantage of those competencies to grow the region’s economy. The recommendations are informed by the results of our discussions with business leaders.

The report begins by summarizing the region’s key economic development assets and by presenting a set of recommendations that explore the implications of the research results for a regional economic and workforce development strategy. The Appendix includes a review of the study’s methodology, summarizes the themes that emerged from the discussions in our business forums, discusses how to prioritize the recommendations, and reviews specific analyses of information collected by other organizations.

* For over 90 years CGR has been known for getting things done. Founded in 1915 by George Eastman, CGR uses its expertise—in research, in analysis, in developing pragmatic recommendations—to help government, nonprofit and business leaders shape positive change for their communities.

BACKGROUND AND RATIONALE

In the industrial era, the strongest regional economies thrived based on the competitive advantage provided by a localized, integrated, dominant industry cluster. Accelerating globalization in a knowledge economy has disrupted this economic model. The impact can be seen in the historic restructuring taking place in the nine-county Finger Lakes region. The region came to depend on the success of Eastman Kodak, Xerox, and Bausch & Lomb, creating a big-company manufacturing culture that has floundered as technologies changed and global economic shifts left the region in a state of decline.

New Business Model

The new business model takes advantage of the ability to share and distribute knowledge instantaneously around the globe. A region's competitive advantage derives from competencies that enable firms to participate in a global value chain. No longer can success be achieved by emphasizing a single technical skill. Successful business leaders must harness R&D capabilities, workplace skills, entrepreneurial knowledge, and market intelligence for the benefit of the firm.

Technology Drives Convergence of Sectors & Markets

An individual firm must have the technical capabilities to contribute to a discrete element of the value chain and the ability to connect to the appropriate value chain. Insofar as competencies support discrete elements of a value chain, opportunities for growth may emerge in applying competencies in diverse sectors. Indeed, innovation and opportunity may be found in the convergence of areas once seen as separate and distinct industries.

Sector-Based Strategies Fall Short

Thus while sector-based strategies have a role to play, the new business model emphasizes competencies that cross sectors and technologies. Successful entrepreneurs seek opportunities wherever they are to be found.

Wired's Purpose

Fundamental change is required to transform the Finger Lakes Region to enable it to take advantage of these new business

models to create a region that is innovative, entrepreneurial, agile, and aligned with global opportunities. The Finger Lakes Wired partnership was awarded \$15 million in federal funds to create an integrated workforce, education and economic development effort to support this transformation.

Under the federal award the Wired partnership took advantage of technical assistance provided by New Economy Strategies (NES) to conduct a traditional analysis of the regional economy, identifying what industry sectors have a strong presence in the region. This was valuable, but left many partners frustrated with the inability to identify competencies and strategies from a “30,000 foot” perspective.

CORE COMPETENCIES*

Clusters Driven by Competencies

As a starting point for our analysis, CGR reexamined the foundations of the cluster concept. Clusters are intended to break away from traditional classification of firms by product categories. One approach to defining clusters is to identify skills that transcend industry and product markets but are common to a region, the region’s competencies. This approach transitions the discussion from the “30,000 foot” perspective to something more tangible and specific.

In order to accomplish this, CGR studied successful firms in the Greater Rochester region to determine what competencies were common to a large number of these successful ventures. Insofar as competencies support discrete elements of an existing value chain in a company or a region, opportunities for growth may emerge by applying the same competencies to additional sectors or markets. Ultimately, these competencies should form the basis for a strategy of economic development to build the economy and

* See a discussion of approaches to identifying competencies and the challenges of cluster identification in the Methodology section below beginning on page 25.

expand our capacity to compete in an increasingly competitive global marketplace.

Competencies Drive Competitiveness

A shift in focus to competencies reflects the fact that the competitive advantage of a company—or, indeed, a region—is no longer rooted in access to a key natural resource, knowledge of a particular product market, location at a physical transshipment point or even proximity to markets (factors that drove regional competitiveness in the mid 20th century). Competitive strength is driven by the application of critical expertise by market participants to existing and emerging business opportunities.

The Age of Specialty Economies Has Ended

The premise that a region can be successful by specializing in a narrow set of abilities and capabilities - that success comes to firms with a unique “core competency” - is becoming obsolete. In a world in which technologies and markets are rapidly converging, the competencies that signal the difference between success and failure will transcend firms, markets and technologies.

Management Competencies Make the Critical Difference

More than ever before, management competencies are what matter to the emerging powerhouse firms of the 21st century—and dominate the importance of technical competencies. Strategic sensibility, responsiveness to customer need, talent management and operational excellence are what distinguish ordinary companies from superior companies. Additionally, successful advanced manufacturing and related service firms exhibit an ability to perform high level systems and process integration (an observation made to us early in the project by Jay Martinez of GRE).

Key Technical Competencies Enable Broad Economic Expansion

Technical competencies still matter, although the most valuable technical competencies are those that apply across markets and sectors. Optics/imaging, and information and communications technology, for example, are technical competencies whose strength lies in their capacity to be applied to diverse sectors and to provide solutions to a variety of business problems, thus enabling broad growth in the economy.

Enabling Competencies

Another characteristic of an effective economy is the presence of “enabling” competencies among support network participants. As companies continue to dis-integrate, keeping fewer and fewer functions within the company, the support network becomes more capable and critically-important to the success of a regional economy. This support network is even more important to new and small firms. Indeed, an effective support network can make it possible for firms to achieve significant market success while still very small.

The network of connections between companies, the universities, trade associations and other entities make both enabling technologies and collective expertise regional competencies.

Critical to the support network are local colleges and universities, entities and programs providing direct assistance to new firms (e.g. High Technology of Rochester), business associations (e.g. Greater Rochester Enterprise and the Rochester Business Alliance), the public sector (e.g. Empire State Development and NYS Department of Labor, Genesee/Finger Lakes Regional Planning, the Rochester/Finger Lakes Regional Development Corporation plus county and municipal economic development entities), and business service firms (particularly finance, law and accounting).

Particular focus has been placed on the academic research centers dedicated to optics, manufacturing, agriculture, and biosciences as vehicles to define and sustain sector growth in the Finger Lakes region. Yet it is not sufficient to create a locus of knowledge—it is the dissemination and application of knowledge that marks the difference between a research center that serves as an engine of growth versus those that simply focus on the acquisition of knowledge for its own sake.

Management Competencies

Management competencies are important to connect to the appropriate value chains as well as to leverage technical capabilities necessary to contribute to a market need. Our analysis finds that there are a set of common management practices that enable successful firms to connect to the appropriate value chain, to bring the solution, whether a physical product or a service, to the customer.

The management competencies exhibited by the region's most successful firms include:

**Competency 1:
Systems & process
integration**

Many of the Finger Lakes' business success stories are driven by an uncanny ability to integrate technologies, to bring together processes from disparate sectors, and to address customer needs across divergent markets.

**Competency 2:
Strategic sensibility**

Strategic sensibility is the ability to sense and respond to the market. As the pace of change in the global market place continues to accelerate, strategic sensibility informs companies regarding diversification, acquisitions and geographic expansion. Ultimately, these strategies provide the firm with the ability to identify new markets and judge the future of existing markets.

**Competency 3:
Customer responsiveness**

The marketplace is becoming radically democratized as successful firms develop technologies and cultures that are dynamically attuned to the needs of customers. A feedback loop into "strategic sensibility" influences the direction of investment, talent management and nearly every other aspect of the firm's operations.

**Competency 4:
Talent identification and
development**

Talent management is particularly important to the region's firms. Effective management invests in this competency and nurtures it in its leaders.

**Competency 5:
Quality and operational
excellence**

Facing an entire world of competitors, successful firms have learned that operational excellence founded on a culture of quality will make the difference between profitability and failure.

**Competency 6:
Entrepreneurial ethos**

Vital companies are in a constant state of reinvention. One final critical management competency is the ability to nurture entrepreneurial thinking among staff. As a region, we must embrace and foster entrepreneurial thinking among our citizens.

**Technical
Competencies**

An individual firm must have the technical capabilities necessary to contribute to a market need. Technical competencies can confer a competitive advantage on firms that make a new product or new service possible. Yet products and services are not just about the

technology. Without the operational competencies identified above, good technology will never deliver value to customers or create jobs and income for regions.

**Competency 7:
Information &
communications
technology**

The effective application of information technology is critical to every sector, every product and every service in the 21st century economy. The Rochester/Finger Lakes region is blessed with a deep infrastructure supporting the development and application of appropriate information technology. Paychex exemplifies the principle: It is not an IT firm, but a firm built around delivering value to its customers that is built on the successful application of information technology.

Closely related to information technology, the Finger Lakes brings a wealth of telecommunications knowledge to the marketplace, facilitating the growth of “pure” telecommunications providers (e.g. PAETEC) and many other firms for whom telecommunications is key to their company’s success (the Sutherland Group).

**Competency 8:
Optics and imaging**

The application of optics and imaging to consumer need delivers jobs and income to the regional economy. In partnership with researchers at the University of Rochester and Rochester Institute of Technology, this technical competency has spawned new companies and continues to spur established companies to grow.

Pictometry exemplifies a firm that had control of a critical technical competency in the imaging/IT field, yet was unable to prosper until a new leader, one bringing critical management competencies (particularly strategic sensibility), took charge.

**Competency 9:
Biomedical research**

While better considered as a range of competencies, the University of Rochester Medical Center has been very successful at nurturing and recruiting new talent bringing critical competencies to the Finger Lakes region.

**Competency 10:
Agribusiness/Food
Processing**

Strong ties to Cornell’s world-class food and wine research facilities enable firms of varying sizes and product types to

establish deep technical competencies, thus an effective market presence.

Enabling Competencies

Enabling competencies support innovation, facilitate cross-fertilization across technologies and markets, improve communication between business and government, and supply critical services to emerging companies.

Competency 11: Translational science

Bringing the knowledge from the laboratory to the consumer is critical. The University of Rochester Medical Center was just recognized by the National Institutes of Health for its historical commitment to translational science in medicine. Key to the contribution of RIT's Center for Integrated Manufacturing Systems has been this ability to bring the insights of academia to the business community.

Cornell University, the Agricultural Experiment Station in Geneva and the affiliated Technology Farm have long been involved in "translational science" and are a significant contributor to the region's important food processing sector.

Competency 12: Business network creation and nurturing

Business associations such as High Technology of Rochester, Rochester Business Alliance and Greater Rochester Enterprise, and the sector-based associations like the Photonics cluster and the Tooling and Machining Association have developed competencies focused on network creation and development.

Competency 13: Business service support network

Expertise among the region's law firms, consulting firms and accounting firms bring to the region key supporting competencies in finance, intellectual property, organizational management and other key areas.

RECOMMENDATIONS

Moving up the value chain implies a continuous process of change, innovation and productivity growth...[E]conomies can only grow by inventing new technology, by innovating products and processes and by designing new management methods.*

This is the challenge facing the Finger Lakes region. This challenge is being met on a daily basis by the region's successful firms. Our task here is to recast the lessons that can be learned from these firms in the form of recommendations to develop and strengthen the region's competencies. The recommendations are designed to create a regional environment that will support the continued success of the firms that participated in the forums and to increase their number, i.e., to grow more successful companies in the Finger Lakes region.

This section will begin by reviewing the premises underlying the development of recommendations, and then proceed to identify and discuss those recommendations.

Many of the initiatives recommended in this report are already in place. We did not attempt to acknowledge each of these directly in the text, although some are mentioned by way of example. Our role was to focus on activities that support competency development, not to articulate a comprehensive economic development strategy for the region†.

Many of the initiatives recommended in this report are already in place.

* Organization for Economic Cooperation and Development (OECD), *Moving Up the Value Chain: Staying Competitive in the Global Economy*, <http://www.oecd.org/dataoecd/24/35/38558080.pdf>, 2007.

† An asset inventory that includes existing institutions, programs and activities is being compiled and will be made available in a web-searchable form in fall 2007.

Premises

Several premises guided the development of the recommendations.

- 1) The lessons learned from successful firms can provide guidance for the development of a regional strategy.
- 2) A corollary to the first is that firms already in the region are a critical source of future economic growth. Any region needs a portfolio of economic development investments – attraction, start-ups, and firms already in the region – but the growth of existing firms is too often given the least attention. Insofar as the majority of economic growth comes from the success of companies already in the region, a concentrated effort should be made to enhance the skills and capabilities of those businesses.
- 3) Leading sectors/clusters, as defined by the studies referenced above, represent local and regional strengths and are an important asset for economic strategy. The very specific activities and skills that coalesce in a cluster may be linked to scientific or educational institutions, historical heritages, natural resources, geographic location and so on. Regional strategy should capitalize on these strengths. Creating connections within existing industry sectors may also assist in attracting new companies to the region to take advantage of the network of industry-specific support.
- 4) While the sector focus is important, changes in the marketplace have transformed the competitive market such that competencies required for success are to a large degree common across sectors, rather than sector specific. Moreover, many firms studied by CGR have been successful because they are willing and able to look to new markets in new sectors for expansion opportunities. In this regard, it is important to provide opportunities for cross-fertilization.
- 5) Resources supporting economic development will always be scarce and should be deployed as efficiently and effectively as possible. Furthermore, in a recruitment context, the region should present a consistent message to companies inquiring

Key competencies are not unique to specific sectors.

about opportunities within the region. GRE's region-wide site and building inventory (funded by Wired) speaks to the nature and value of such cooperation. *

- 6) Finger Lakes Wired represents an unprecedented level of collaboration among regional stakeholders. This is not to suggest that regional collaboration is new to the Finger Lakes region—many successful collaborative efforts have preceded it. Yet this is arguably the broadest and most inclusive of these efforts to date. In the recommendations that follow, we will discuss opportunities to further strengthen and leverage this regional competency. But even now, this collaboration should be considered a significant accomplishment and asset for our region.

Recommendations for Developing Management Competencies

CGR concludes that key management competencies are critical to the success of individual firms and to the success of the regional economy as a whole. The recommendations in this section are directed at promoting management competencies.

Recommendation 1: Celebrate and share management achievements across sectors

We applaud the Rochester Business Alliance for sponsoring the Top 100 and the *Democrat and Chronicle* for its coverage of Top 100 winners. By focusing attention on what makes companies successful, the Top 100 promotes cross-fertilization of effective management practices. There are other examples in this community. The importance of these initiatives cannot be underestimated.

Recommendation 2: Encourage business leaders to learn from other successful business leaders

Many leaders of successful businesses identified trade shows and professional conferences as important sources of managerial inspiration and market intelligence. *Good managers learn from others, even across sectors.* Despite the increasing importance of the Internet in establishing and maintaining connections, the face-to-face

* The asset database/map discussed in this report will help further collaboration within the region.

connection established at conferences remains an important part of business.

Greater Rochester Enterprise and other entities represent the Finger Lakes very ably at these events outside the region. GRE and others have also been active sponsors and organizers of major conferences in the Rochester area, such as the Fuel Cell Conference just held in June. Participation in statewide organizations can help accomplish the same goal, (e.g., NY Loves Bio).

The primary purpose of many of these activities is business attraction. However, business leaders participate in these events to learn from other business leaders. The knowledge and strategic partnership opportunities in these events need to be recognized and supported.

**Recommendation 3:
Support managerial
development across
sectors**

The Greater Rochester region is also endowed with a large and effective higher education sector. Many of these institutions provide formal education in business practice. While the William E. Simon School of Business at the University of Rochester may be the best known outside the region, business programs at many other institutions, including the community colleges, support the development of management competencies within the region.

Many business leaders will not choose to enroll in a formal course of study. Less formal educational opportunities sponsored by GRE, the Rochester Business Alliance, Wired, and other organizations are vitally important.

**Recommendations
for Developing
Technical
Competencies**

Technical competencies depend on two elements: knowledge development and workforce development.

The research indicates that the region's technical competencies can be nurtured through sector-related networks, some of which are already organized and functioning in the Finger Lakes (e.g. the Photonics Cluster and the Tooling and Machining Association). The first recommendation in this section focuses on knowledge

development and is designed to take advantage of business leadership (and test business commitment), while taking advantage of the sector-focus of the core competencies. The second recommendation focuses on workforce development. While the majority of talent issues are best dealt with on a sector basis, the implementation of many workforce initiatives will benefit from cross-cluster collaboration and regional coordination.

**Recommendation 4:
Facilitate development of
technical competencies,
market intelligence &
networking**

The Finger Lakes area already has sector-based employer groups already established. One key priority should be to encourage firms in sectors that have not established groups to form them and to encourage activities proven in other regions to promote growth.

Challenge grants could be issued to support organizing employers in the sectors that have emerged as the basis of regional technical competencies: optics/imaging, advanced manufacturing, biomedical, business and information services, and agribusiness/food processing.

Sectors would be encouraged to undertake a signature initiative in one or more of the following areas:

- ❖ *Global benchmarking* to provide sector business leaders a better sense of what is happening in terms of global markets and how to connect to these markets. The study should help identify emerging markets and recommend specific actions that can be taken to help regional firms to connect to those markets.
- ❖ *Regional Marketing* to enhance connections within the sector and embrace a “pull” marketing strategy. Particular emphasis should be given to leveraging the emerging digital infrastructure, inexpensive and easy-to-use Web services, and tools to create, communicate, and share information.* The forums clearly demonstrated the importance of networks/connections to business success. More

The Internet enables businesses to expand their relationships with partners, suppliers, and customers beyond their local neighborhood.

* This recommendation draws on the Intuit Future of Small Business Report, Second Installment: Technology Trends and Small Business.

and more, business connections are established and maintained through the connected world of the Internet. The Internet enables businesses to expand their relationships with partners, suppliers, and customers beyond their local neighborhood, and social software can be used to develop broader and deeper relationships.

The sectors need to exploit these capabilities in two ways. First, they need to use these tools to enhance connections with the region/sector (see, for example, the Capital Region’s Technology Roadmap at <http://www.technologyroadmap.org/>). Second, the sectors need to take advantage of the opportunities for “pull” marketing created by the Internet. The Internet provides broad and deep access to detailed information on almost any topic.

Under this paradigm, regions/sectors that publish easily findable, content-rich marketing materials in the right place, at the right time, and in the right context will shine. White papers, press releases, articles in industry publications, industry news, and other information of interest to customers will enhance the authors and region/sector’s brand and reputation.

- ❖ *Sector regional presence at key trade and professional conferences.* The sector should work with its network to identify opportunities for trade and professional conferences that can be attracted to the Finger Lakes, both as a way of promoting the region’s competencies and as a way to share key technical competencies among Finger Lakes firms within the region. Where feasible, the sector should look for opportunities to establish a regional presence at appropriate trade and professional conferences.

**Recommendation 5:
Adopt competency
management as the
platform for workforce
strategy**

The forum discussion reaffirms the importance of skilled workers to business success. This is not surprising, since each major business challenge – be it launching a new product or service, expanding into new international markets, or undergoing a financial turnaround or corporate repositioning – creates a corresponding talent challenge. As a consequence, the issue of talent management has become a business imperative. It should also be a regional imperative.

Competency management touches every other process area in talent management, underlying sourcing and recruiting, performance management, succession planning and leadership development.

Recent research on talent management shows that competency management is the foundation for getting the right people, in the right job, at the right time, in the right place, and at the right price. Competency management is “the continuous process of identifying and clarifying the key competencies, behaviors, values and principles necessary for an organization’s success. It involves the development of job descriptions, clear definitions of proficiency levels, and clear and simple assessments of what drives performance and potential.” Competency management touches every other process area in talent management, underlying sourcing and recruiting, performance management, succession planning and leadership development. With effective competency management processes, recruiters can source the right candidates, managers can assess high and low performers, executives can identify the potential leaders, and training managers can develop the best interventions.*

A focus on competencies should underlie the region’s workforce initiatives in the following areas:

- ❖ *Talent: Pipeline* -- career awareness and career pathway initiatives targeted at middle school and secondary school students. The graying of the workforce and the exodus of young talent from the region make it imperative that we do a better job of making students aware of the career opportunities in the Finger Lakes. This is best done on a sector basis. Indeed, initiatives are already underway (e.g., see <http://www.rit.edu/~kocwww/> - an RIT program that offers 30 scholarships from Wired as well as the Wired Educator Intern program). The “ideal model” would include:
 - ◆ Career Awareness (classroom presentations, educational tours, summer camps, online activity) targeted at middle school students.

* “High Impact Talent Management.” Bersin and Associates. May 2007.

- ◆ Career Exposure (job shadowing, mentoring, applied curriculum class presentations, skill and interest self-assessments) and work readiness skill development targeted at grades 9-10.
- ◆ Sector-Focused Application (mentoring, internship and co-op, technical skill development and certification, work readiness skill development, dual enrollment) targeted at grade 11-12.
- ◆ Curriculum Alignment between high school, two-year post secondary, and four-year post-secondary institutions based on articulated career pathways.

At each point along career pathways, the objective is not only to prepare students for the next levels of education and employment but to motivate them to advance by exposing them to the opportunities available.

- ❖ *Align learning outcomes with workforce competency requirements.* The sector career pathways provide a foundation for an initial dialogue between sectors and the post-secondary institutions. As a first step, the partners need to see how the existing degrees and certificates available through the region's post-secondary institutions align with the positions in the sector career pathways. This mapping becomes the basis for communicating the relationship of educational and career opportunity in the region. Gaps along the pathways become the basis for program development if sufficient need can be validated.

The goal is to increase the alignment between the learning outcomes and the required workplace competencies.

A second round of discussion related to the career pathways would address the skill gaps identified by employers. This would take the form of a curriculum audit, assessing the alignment between the program's learning outcomes and the competency requirements articulated by sector employers. The goal is to increase the alignment between the learning outcomes and the required workplace competencies. Modification of curriculum is one possible outcome. A second is the development of certificate programs (post-baccalaureate or other) or focus areas within a major to address the skill gaps of the sector workforce (for

example, a pharmaceutical certificate designed to prepare biology majors for sales or other career opportunities in the pharmaceutical industry).

Another outcome for a sector/learning provider partnership is the development of a short program (one week maximum) that would provide an introduction to the industry. North Carolina has had some success in using such sector introductions to attract new candidates to sector-based education and training programs. The program could also serve as a supplement for the career pathways initiative.

- ❖ *Regional recruiting campaign.* Weak brand recognition is one of the difficulties that small and mid-sized firms face in trying to attract talent. Another is a lack of resources to devote to recruiting, as well as an unpredictable hiring cycle that may keep firms from participating regularly in events like campus career fairs. The collective invisibility of the firms in a sector results in a perception that the labor market lacks the “thickness” necessary to provide a second job opportunity should the first one not work out. Recruiting as a region on a sector basis is potentially an effective way to overcome these limitations. The goal is to brand the sector as a career opportunity, and to aggregate the demands of the individual firms to produce the depth necessary to show the thickness of the region’s labor market and to achieve the scale needed to participate in key recruiting activities. While several regions market their sectors as part of business attraction campaigns, CGR is unaware of any regions that have equivalent campaigns targeted at attracting talent to its sectors.

Brand the sector as a career opportunity. Aggregate the demands of the individual firms to produce the depth necessary to show the thickness of the region’s labor market.

It is important to recognize that in today’s competitive talent markets, recruiting must be taken very seriously. Sectors must learn where the right candidates are, how to find and approach

them, and how to market to them. Key elements of such a campaign include:*

- ◆ Knowledge of what skills sector employers seek (based upon traits of top performers among their employee base). Ultimately, the sector (or individual employers) will need to map these against applicants and/or candidates in recruiting.
- ◆ A well-designed web site. The site should provide a complete expression of the attributes that characterize the sector's employee's work day experience. It is a window into what it's like to work in the sector in the Finger Lakes region. The content should be: (1) real, i.e., believable to both the external audience and, equally as important, to employees in the region; (2) relevant, i.e., it should highlight the attributes that are most important to the high-caliber workers the sector employers most want to recruit (The best way to identify those factors is to ask what made the sector's best performers say "Yes" to their company's employment offer and what keeps them there); and (3) recognizable, i.e., differentiate the region and set it apart in the minds of the top talent the sector is trying to recruit.
- ◆ The site should provide visitors a way to ask questions (and have them answered in a timely fashion). It should include one or more listservs or discussion forums that deal with topics of interest to the sector's key recruiting demographics. Ideally, the sites would be administered by one or more of the sector's best employees so that these conversation areas become a place where other top professionals can hang out and share their views with their peers.
- ◆ The site should also provide separate entranceways and areas for key demographics and tailor the content to their interests and needs (e.g., separate doorways and areas for soon-to-be college graduates, diversity candidates, veterans, mid-career professionals).

* The ideas in this section are based on best practice for talent acquisition, employment brand management, and corporate career websites. Material is drawn from Weddles (<http://www.weddles.com/>), ERE (<http://www.ere.net/>), Interbiznet (<http://www.interbiznet.com/>), and "The Global War for Talent: Getting What You Want Won't Be Easy." Aberdeen Group, June 2007.

- ◆ Advertising at Web-sites and in any other venues where there is likely to be a high ratio of the top talent the sector's employers are trying to reach. These might include: job boards that offer features for passive as well as active job seekers, association sites, newspaper sites, search engines, print newspapers, print professional journals, and commute time radio programs.
- ◆ A sector presence at key recruitment events. This might include diversity fairs, professional association conferences, and/or campus recruiting at targeted colleges. While an individual firm may not have an opening for which it is recruiting, at any given time the sector will have openings. Selling that collective opportunity will be critical.
- ◆ The ability to connect quickly and communicate proactively with desired candidates via conventional and more interactive means. Effective recruiting requires developing a relationship with potential employees, often long before they are candidates for a specific position. This means that a regional or company effort must create a data depository of desirable active and passive candidates, and maintain an ongoing dialogue with the individuals in the database. The individuals in the database may include secondary students in a regional career pathway, post-secondary students from regional or other colleges that have been identified as good sources of talent, individuals drawn to a regional/sector talent marketing campaign, and/or candidates for specific vacancies in regional companies. It must then use a variety of tools to communicate with these individuals on an ongoing basis.
- ◆ Tools to better understand which job sources provide the best candidates. Sources of talent range from community based organizations, to local colleges, to colleges outside of the region, to specific venues for placing ads. Any regional or company effort to attract talent must begin to identify and monitor its most productive sources for each type of position. It also requires that the region and/or company have appropriate metrics for assessing the "best" candidate (the best-in-class companies use "quality of hire" as a metric).

Promoting Enabling Competencies

Enabling competencies are manifest in the structures and processes that channel technical and managerial competencies into a common fertile ground, and provide the necessary nutrients to produce company (and regional) growth. The recommendations in this section focus on three key “nutrients:” operations, market intelligence, and education/research.

Recommendation 6: Develop a database of critical resource providers and supporting information

The forum results clearly show that effectiveness and efficiency across a variety of operational functions and/or business processes is critical to business success. While each individual company has ultimate responsibility for its operations, the region can establish an infrastructure that improves the interaction and exchange among business owners and critical resource providers or operational experts. Based on the forum results, operational areas that may be included in the resource infrastructure include: quality, technology, customer service, human resources, organizational development, product strategy, and innovation. In general, the operational infrastructure is company focused, i.e., it provides individual firms access to operational expertise and addresses issues of concern to all clusters, although a given cluster may have unique operational issues that warrant attention.

The base elements of an infrastructure are:

- a. An asset database that lists the critical resource providers and operational experts in the region in each focus area;
- b. An online library of effective practice, case studies, audit tools, etc. that is updated on an ongoing basis;

Recommendation 7: Continue and enhance ongoing opportunities for the dissemination of key knowledge

More established and progressive infrastructures would also include more proactive components, including:

- a. An ongoing series of forums and workshops that provide business owners an opportunity to interact and share experiences with each other and operational experts around specific issues or cases;
- b. An awards program that recognizes regional firms for innovation and excellence in an operational area. Where possible, the awards program would be administered by the appropriate professional

association (e.g., an HR awards program could be administered by the regional Human Resources Association).

The region should explore the feasibility of establishing a consultant's consortium in the targeted operational areas. A consortium would go beyond a simple listing of regional providers to establish what in essence would be a list of preferred providers. Consultants on the list would agree to provide services to companies at a reduced fee and to participate at no charge in regional forums.

**Recommendation 8:
Establish a vehicle to
provide companies with
access to competitive
intelligence on markets,
customers, and
competitors.**

The forum discussions make it clear that market intelligence is a scarce and critical resource. Recent research by Deloitte conducted on behalf of the Competitive Strategy Roundtable, a special interest group within the BPM Forum, shows that the successful CEOs in our region are similar to those around the world: while most executives feel they can accurately identify the major challenges affecting their industry sectors, far fewer feel confident about their ability to anticipate them. Regional services to provide firms access to such competitive intelligence are a common part of "economic gardening" programs. The region should benchmark existing programs and design and implement a program appropriate to the needs of the Finger Lakes Region.

**Recommendation 9:
Work with Rochester Area
Colleges to provide a
coordinated regional
response to sector
workforce needs**

Rochester Area Colleges (RAC) coordinates engagement between the area's educational institutions and the region. Building on its Biz2Edu.com portal, RAC could be a vehicle through which the sectors can partner with the region's post-secondary institutions on a collective basis to ensure the sector firms see the region's post-secondary institutions as a preferred source of talent and development opportunities. Each learning institution has its own set of capabilities and competencies. One key to a successful partnership would be delineating each institution's unique capacities in order to identify how each could best contribute to enhancing the region's talent base. Engaging RAC as an active partner in the appropriate regional workforce initiatives highlighted above – talent pipeline, aligning learner outcomes to

workforce requirements, and regional recruiting campaign – would be the best way to ensure this outcome.

RAC would also be an ideal forum in which to establish a regional internship initiative. The connection to the clusters would help ensure that the region's small and mid-sized firms get appropriate attention as students search for internship and employment opportunities.

**Recommendation 10:
Focus attention on the
dissemination of
knowledge from
Universities to the
marketplace**

RAC may also serve as the organizing point for the type of events that would provide sector employers (and faculty from other institutions) with exposure to the cutting-edge research and applications being developed at the region's research universities. This would help to increase the level of knowledge and technology embodied in the sector firm's production and exports.

**Recommendation 11:
Establish a vehicle for
two-way communication
between training
providers and business
firms supporting
immediate training needs**

The time frame is of critical importance when thinking about a talent pipeline. Skills are learned over time, through education, instruction and practice. The focus here is on short-term investments (e.g., up to 18 weeks) in education and training that will prepare an individual to fill a current need in a sector labor market. The core elements of an effective program include:

- ◆ Articulation of employer demand. These programs require that the sector have identified positions that do not require long-term education/preparation and for which employers have an immediate need.
- ◆ Establishing standards based on demand. Top performers should help to delineate the competencies required for success in the position. They also help to identify the demographic characteristics that can be used in an outreach campaign to potential students.
- ◆ Creating/aligning learning to these standards. The competencies become the basis for program development and competency assessment.
- ◆ Designing and implementing a marketing campaign. Many short-term training programs fail because they do not attract the necessary students. As noted above, the demographic

characteristics can be used to design an effective outreach campaign to potential students.

- ◆ Deliver learning to meet individual needs. Students will enter the program with different levels of competence. The program should have multiple tracks (e.g., standard, fast-track, and remedial) that tailor the learning to the individual's prior preparation and experience.
- ◆ Award certificates and credentials based on demonstration of competency. The competency standards are the basis for program completion.

Other Issues Raised in CGR's Forums

While the following issues do not directly apply to the issue of identifying and promoting competencies, they were often raised by forum participants. We introduce them here, recognizing that these issues are significant.

Promote Competitive Business Climate

Despite our best efforts to focus on company strategy and action, business climate issues emerged as significant concerns and challenges. Unshackle Upstate already exists to address these issues. Forum participants suggest that a regional strategy should include an explicit endorsement of this group's activities.

Regional Coordination and Accountability

Many forum participants expressed concern about the multiple entities involved in regional economic and workforce development, and urged that regional coordination and accountability were necessary to ensure the successful implementation of any regional strategies for economic and workforce development.

Explore Improved Metrics for Regional Vitality

The forums revealed a clear dislike for some of the traditional measures of economic vitality, particularly a single-minded focus on job growth.

For example, if the region wants to focus on wealth creation through exports, then exports should be tracked as a metric. If product innovation is a desired goal, then it makes sense to track the percentage of sales generated by products that are less than three years old. A variety of international, national and regional indicator projects have been undertaken in recent years to develop,

track and report on progress using measures more attuned to the knowledge economy. These may be used as benchmarks and sources of possible indicators. The Finger Lakes region could take the lead on new metrics as Empire State Development Corporation explores these questions anew on behalf of the state.

CONCLUSION

The Finger Lakes region is undergoing a fundamental change. It is shaking off the big-company manufacturing culture to create a region that is innovative, entrepreneurial, agile, and aligned with global opportunities. Under the new business models that underlie the region's transformation, competitive advantage derives from competencies that enable firms to participate in a global value chain.

This research sought to identify these regional competencies. We found that the competencies that are critical to the future of the region's firms are the *management competencies* that are common to all sectors. Convergence and the dynamics of the global marketplace have reduced the centrality of *technical competencies*.

The results show that to be successful, an individual firm must have the technical capabilities to contribute to a discrete element of the value chain and the ability to connect to the appropriate value chain. This report recommends that we can best assist firms in the region to grow by creating an environment that helps establish these fundamentals, and presents a series of recommendations to help create that environment.

APPENDIX

Methodology

The Challenge of Describing Competencies Using Reported Labor Statistics

This section discusses our key steps to the analysis, beginning with an overview of the “competency” concept and how it applies in a strategic context.

The most common method used to identify regional competencies is to begin with the definition of dominant industry clusters in a region. This makes sense as a cluster is intended to describe a group of firms that share particular competencies, a specific technology, or a particular network of supplier firms that share a competency or technology. The cluster concept was very useful in describing and capturing the complex interactions common to business ventures that were successful in the 20th century economy.

Unfortunately, as reflected in the collective frustration with the New Economy Strategy “Regional Cluster Overview” and other analyses, the cluster concept is easily described but very difficult to put into practice. Any attempt to use clusters as a foundation for the identification of competencies is doomed if deficiencies in the data yield a cluster definition that is fundamentally driven by product markets.

Sector labels based upon NAICS codes are of minimal value in understanding successful firms as their growth strategies often involve expansion into other product sectors or a focus on service that is not captured by the NAICS code.

Sector labels, based upon NAICS codes, are of minimal value in understanding the achievements of successful firms as we find that their growth strategies often involve expansion into other product sectors or a focus on service that is not captured by the NAICS code.

This section outlines the difficulties with using some of the standard methods for identifying clusters, and presents the alternative approach to measuring competencies that was used in this research.

North American Industry Classification System (NAICS)

The North American Industry Classification System (NAICS), the foundation of the NES analysis, is the most commonly used tool for defining clusters. But NAICS has three weaknesses. First, the

NAICS categories, while better in many respects than the old SIC classification system, are still organized largely around product markets—thus missing those clusters that are organized around a common technology or workforce competency that crosses a product classification.

CGR suspected that many of the Finger Lakes region’s distinctive strengths—its true “clusters”—could not be described by reference to product markets, but rather workforce and management competencies, and common technologies. Based on NAICS codes, the NES data are not very helpful.

Second, the cluster concept may also be defined by supply and supporting relationships, many of which will be with companies in seemingly unrelated NAICS codes. Competencies developed in support of a core cluster or industry may remain in the region even if the core cluster or industry is no longer dominant. Organized by product markets, these will not be apparent in the NES data.

Third, even for those clusters in which the NAICS classification is useful, the data are simply too highly aggregated to provide the kind of informative “texture” that is needed for a sound strategic plan. All that the cluster data tells us is the employment and revenue numbers of NAICS product categories and the companies belonging to these categories. That isn’t a bad place to start. But it just doesn’t go far enough.

Location Quotients

Another way to define a promising cluster is by looking at location quotients, essentially a measure of market share adjusted for the size of the region. A high location quotient (LQ) suggests that a region has a conspicuous strength in the industry.

There are three problems here. **First**, the very idea of a location quotient is contrary to the cluster concept. The key insight of a cluster is that economic success in the new economy can—and typically does—occur *across* sectoral definitions. As traditionally applied, the location quotient has no relevance.

Second, the location quotient has always been a victim of the aggregation that is necessary for any practical system of classifying companies. As an example, in the mid 1990s one of the prominent business magazines (Forbes or Fortune) released a report describing metro areas by their degree of diversification. Rochester ranked near the bottom of the list as the definition employed four digit SIC codes to define industries. As Kodak, Xerox and Bausch & Lomb all were captured within “Photographic Equipment and Supplies,” these three firms were considered part of the same industry. Rochester had a high location quotient in this SIC code—despite the fact that the core “competencies” of these three disparate firms were quite different.

Thus regions can have a very successful group of companies occupying a promising cluster but with a very low measured LQ simply because the niche they occupy isn’t large in the context of the underlying classification scheme.

Finally, a high location quotient may simply reflect a legacy market position. The optics cluster is a good example: The high location quotient in optics is driven by Kodak—clearly a company that is locked in a struggle for survival. This is not to suggest that optics shouldn’t be a focus of attention in the future, but the high LQ is almost solely attributable to Kodak.

Profitability and Growth

Success in the market place offers a more granular definition of competency, one that focuses on the individual firm. Success can be measured by profitability, although this is undisclosed for private companies. Growth can be used as a proxy for profitability as successful companies are making profits and are therefore able to grow. But growth or profitability is a symptom of competency, not the root cause of success. Getting at root causes requires a more intimate knowledge of the individual companies.

CGR’s Approach to Capturing Competencies

Identifying successful economic development targets is partly a matter of judgment. As currently gathered, there is not a single set of statistics that will accurately identify the region’s key opportunities. With that in mind, CGR proposed a different way

of looking at the regional economy – by identifying which firms have been successful, and asking them why. CGR believed that common reasons for success, if they could be found, would reflect a definition of competency that could form the foundation for a regional economic development strategy. The Finger Lakes Partnership liked the idea, and the study was approved.

Step 1: Summarize Key Findings of NES, CIMS and GRE Analyses

CGR began by reviewing the information that has been gathered already by NES, Center for Integrated Manufacturing Studies (CIMS), and Greater Rochester Enterprise (GRE). We reviewed the NES data, met with Nabil Nasr and Andy Harlan from CIMS, and considered the clusters identified on the GRE website (we also contacted Jay Martinez from GRE for additional input). The results of this step informed the conduct of activities in subsequent steps. For example, the seven clusters from the NES analysis – advanced manufacturing, agriculture/food processing, biomedical, energy, healthcare, information technology, and optics – were useful in helping to categorize the successful firms identified in Step 2 of CGR’s analysis. These clusters were also used as the basis for organizing the business forums in Step 3.

One activity in Step 1 deserves special mention. CIMS shared with CGR some of the survey data that it had collected during the Roadmap Project. CGR conducted additional analysis of the data to see if there were any clear differences between high and low performers (both in terms of profit and revenue per employee), as well as between clusters for the survey respondents. We provide a table highlighting the main differences at the end of the appendix (Forum Themes). These findings were used to support and/or validate the results of the forums (see Step 3), as appropriate.

Step 2: Identify Successful Businesses

One company-level indicator of success that had not been used for this endeavor was the Rochester Top 100. Now in its 20th year, the Top 100 ranks privately held companies in the Rochester region based on the three most recent years of revenue growth. CGR conducted a formal analysis of the Rochester Top 100 lists in order to develop a list of the most successful companies of the Rochester area. Using the last 10 years of data from KPMG, the

repository for all the Rochester Top 100 data, CGR determined the companies that have been consistently present in the Rochester Top 100. We analyzed these companies using several different criteria, including the year in which the company was founded, the number of employees, and the main industry in which KPMG categorized them. CGR then conducted research on each of the companies who met its criteria to determine their core business. CGR classified each company by their most relevant NAICS code and analyzed the companies according to the NAICS codes to determine what patterns emerged within each cluster.

The distribution of companies showed that successful firms were most prevalent in Information Technology (IT) and Advanced Manufacturing and to a lesser extent in Optics/Imaging. There were two additional sectors represented, Biomedical and Agribusiness/Food Processing. Based on the companies identified, CGR added an additional sector: service. CGR's analysis identified no firms in two clusters, Energy and Healthcare. CGR's analysis revealed 101 possible firms for inclusion in focus groups during the next phase of our study. In addition to this list, we also reviewed the RBJ Lists for information on the top 25 public companies. Eight of those companies were added to CGR's list of 101 firms. Finally, CGR turned to representatives from GRE, CIMS, and HTR to identify other successful companies who were not on the Rochester Top 100 list (either because they were relatively new, outside the Rochester region, or possibly chose not to nominate themselves to the List). CGR also worked with industry associations and key business leaders to identify any outlying firms that should be considered. As a result, CGR identified and invited the CEO or President of 160 different firms in the greater Rochester region to participate in the business forums (see Step 3).

**Step 3: Convene
Executives of Successful
Businesses to Identify
Competencies**

The second step in our analysis created a list of firms whose leaders have demonstrated the ability to succeed in their markets. From there, CGR convened a series of eight focus groups with these identified leaders. Particular attention was given to

connecting and meeting with business executives who are seen by their peers as leaders with vision.

Each of the forums consisted of businesses in the same or similar industry type. Forums were convened with firms in the following sectors: optics/imaging, biomedical, advanced manufacturing, services, agribusiness, and information technology. Individual phone interviews were conducted with several business leaders who were unable to attend a forum but wanted to participate in the study. The main goal of these forums/interviews was to: (1) Identify the competencies that enabled these firms to be successful; and (2) Achieve a better understanding of the challenges existing businesses face as they attempt to grow in the region. The results of these discussions are presented in detail in the next section.

Step Four: Identify core competencies of the region and provide recommendations for continued success

This research was guided by two hypotheses. The first hypothesis is that the “competencies” that used to support the region’s dominant clusters remain a viable foundation for economic development despite the breakdown of the dominant clusters. We sought to test this hypothesis by seeing if there is a common set of competencies shared by successful firms in the region’s target clusters. A common set of competencies within a cluster would be the region’s core competencies.

The second hypothesis is that there is a set of common management practices that enabled these firms to succeed despite the breakdown of the dominant cluster in which they are a part. We sought to test this hypothesis by identifying the management practices that these firms saw as the basis of their competitive advantage. A common set of management practices could be used by other regional firms as a roadmap to success. Step 4 involved a review of the forum results to test these two hypotheses, and the development of a set of recommendations based the research results for how Finger Lakes Wired can utilize the funds at its disposal to provide for a sustaining impact on the region.

The next section of this report summarizes the results and information collected through the business forums and interviews.

Forums with Successful Firms

The forum agenda was divided into five topic areas: company background, competitive advantage, business challenges, talent, and final comments. This section of the report will summarize the results and/or themes that emerged from the discussion in each of these topic areas.

Company Background

Participants were first introduced themselves and provided information about their company – its primary products/markets, number of employees, age, etc. Thirty-nine companies participated in the forums and/or interviews.

Fourteen were in the optics/imaging/biomedical sectors and a similar number were in the service sector. Five firms were in advanced manufacturing, five firms were in information technology, and one firm was in agri-business. Three of the companies were spin-offs from the University of Rochester and three were spin-offs from larger companies (Kodak, Xerox/Corning). Three were subsidiaries or had recently been acquired by a larger company. The average firm was 25 years old and had 130 employees. The youngest firm had been in business two years and the oldest 134 years. The smallest firm had 12 employees and the largest had 600 employees.* A list of the participating companies is provided later in this appendix.

Observations

Three observations emerged from consideration of the descriptions provided by the participating companies.

Key Insight: Sectors Labels Have Limited Value

First, the sector labels based upon NAICS codes are of minimal value in understanding these firms. The firms' growth strategies (see the next observation) often involve expansion into other product sectors or a focus on service that is not captured by the

* The oldest firm was also the largest. If that firm is taken out of the sample, the average firm age goes down to 14 years and the average firm size is reduced to 111 employees.

Key Insight: Successful Firms Have Common Growth Strategies

NAICS code. The best example of this principle is an IT firm that now provides a business service. Is it best classified as IT or service? Equally telling is a distributor of machining equipment that decides to develop its own machines, and then applies/sells that equipment in an entirely new industry.

The following type of transitions and transformations are indicative of the growth strategies adopted by these successful companies. Four major growth strategies can be identified in the participating firms' discussion of their business products and markets:

Strategy One: Diversify application, geographic market, and/or service

Fourteen of the firms made explicit reference to diversification as a growth strategy. Three distinct types of diversification were discussed. First is diversification of application, i.e., taking a core product or competence and applying it in different sectors. Second is diversification by geographic markets, i.e., expansion into other regions or countries. Third is diversification of services, primarily with an eye toward becoming a full service provider and/or increasing the value-added by the company to its clients.

Strategy Two: Build growth on key technology

Eleven of the firms base at least a part of their growth strategy on a first-mover advantage in some technology. A few of these firms that may have lost a first-mover advantage believe that they can use their technology expertise to identify and apply new technologies that will enable continued growth.

Strategy Three: Identify niche/boutique markets

Eight of the firms have targeted niche markets as a basis of their firm's growth. For example, one accounting firm specializes in services to nursing homes and small cap businesses, while a community bank focuses its services on high-end small businesses.

Strategy Four: Emphasize customer service and/or quality

While all of the participating firms emphasize customer service and quality as entry requirements for a successful business, the discussion suggests that for some companies, particularly those whose primary business comes from the regional market, enhancing customer service and the quality of their product/service is a key to continued growth.

Key Insight:
**Systems/Process
 Expertise is a Core
 Competency**

The final observation to be drawn from the background discussion is the high level of systems and process expertise in this group of firms. For a few firms – one that designs, build and maintains industrial systems, and a second that provides consulting services in quality and continuous improvement – systems and process are their core business. But most of these firms exhibited an understanding of systems and process (that is the foundation for being able to adopt a growth strategy based on diversifying towards full service) that may reflect a core competency in the region.

Identifying Competitive Advantage

In the second portion of the forum, respondents were asked, “What is the source of your company’s competitive advantage?” A common probe in the discussion was, “What supports/sustains this advantage (with probes related to technical/functional competencies, specialized institutions or strategic partnerships)?”

Five primary sources of competitive advantage emerged from the discussion. These are as follows:

**Define Success Around
 Customer Need**

The ability of a company to achieve a full understanding of its customers, and to use that understanding to design and deliver excellent customer service, is one source of competitive advantage. One participant noted that there was a time when product was primary, but that time is past. The complete service that surrounds the product is what differentiates his company from its competitors. Another participant said that his company’s goal was to provide “customer delight,” a goal that requires understanding the customer’s definition of success.

Achieving excellent customer service requires the ability to establish and maintain good customer relations. Several participants noted that the “care and feeding of clients” was essential to gaining repeat business, a factor that all participants saw as contributing to sustained growth.

Recognize Core Competency Within Firm

Expertise, in the form of staff and/or organizational capacity, is the second source of competitive advantage. The qualifications of staff can serve as a source of competitive advantage in any sector, from optics/biomed where the internationally recognized expertise of staff may be a source of advantage, to accounting where the staff’s understanding of a complex and changing regulatory environment may be a source of competitive advantage. One participating firm felt that its competitive advantage was the knowledge of how to commercialize technology, a skill that they felt was sorely lacking in the Finger Lakes region. Many respondents commented on the importance of sales and marketing expertise as a source of competitive advantage.

The factor most often cited as contributing to staff serving as a source of competitive advantage was, “getting the right people on the bus in the right seats.” In some cases, this was a unique blending of expertise, as when a tech expert joined forces with a marketing guru to launch one of the region’s most successful tech companies. In other cases, such as one participating firm that can assist clients with “prototype through production,” it is the depth of knowledge in the organization that provides it with a unique capacity to deliver a product or service.

Technology is One (but not only) Source of Competitive Advantage

For most of the firms that are university spin-offs, and a few others, cutting edge technology or a unique methodology/process is a source of competitive advantage. However, each of the firms that saw a cutting-edge technology or unique process as a source of competitive advantage also cited other factors as providing a source of competitive advantage. None of them thought that technology alone was sufficient.

Quality/Operational Excellence Sets Successful Companies Apart

Several participants view the quality of their product/service as a source of competitive advantage. This advantage is seen most clearly through a vintner's comments: "consumers have multiple choices of what to buy/drink (e.g., 200 chardonnays in your local liquor store). This intense competition makes the quality of the product a competitive advantage." It is also apparent in a printer who stated that his company competes on quality because they cannot compete on price.

Obviously, achieving quality requires operational excellence. Some firms, however, explicitly perceive operational excellence as the source of their competitive advantage. Thus, one participant noted that the quality of his firm's process and its operational capacity enable a fast "time to market" that is a distinct source of competitive advantage. While another participant cites his firm's distribution channels as a source of competitive advantage, he went on to note that the loyalty from his distributorship was earned through operational excellence – they won over their dealers with on-time delivery, order accuracy, and speed of shipments. This same participant noted that excellence in product development and innovation – the ability to feed new products to dealers to meet their needs – also contributed to high loyalty from their distributorship.

Strategic Sensibility Critical to Success

Each of the participants saw the ability to sense and respond to the market as critical to success. One of these participants said that their growth strategy – which included diversification to enable full service, strategic acquisitions to facilitate entry into new sectors, and geographic expansion – was an outgrowth of such tactical sensibility. Another said that his company's ability to identify new markets, and to understand what portions of his industry are most likely to go off-shore, has been a critical factor in its success.

Supporting Competitive Advantage

It is important to note that no firm will have a competitive advantage in all of these areas. The discussions made it clear that a successful firm will tend to be strong in one or two, with the other factors serving as supports for the firm's primary sources of competitive advantage. From a policy perspective, the supports of

competitive advantage identified by the participating firms may be as important as the sources of competitive advantage, since the most appropriate policy may be to help create a business environment that enables firms to establish a source(s) of competitive advantage. With that in mind, we will now take a brief look at the factors that participants identified as supporting their primary sources of competitive advantage.

Workforce

Talent or workforce was consistently cited as a critical support to competitive advantage. It was particularly important to customer service/customer relations, expertise, quality/operational excellence, and technology. Two themes in this part of the discussion deserve mention. First, participants were generally complementary of the region's workforce. They saw the availability of a skilled and motivated workforce as a critical support. One participant commented that there is a "good workforce here. When other businesses have relocated outside of the region, they find that the workforce may be trained, but the starting point is so much lower that the quality is poor. Some companies have ended up moving back to the area." From this perspective, the region's colleges and universities were seen as a valuable asset, particularly by those firms with a high-tech focus. Second, these firms make an investment in their workforce. The investment is reflected in the importance they attribute to and investments they make in the processes of recruiting, hiring, developing, and retaining talent. This issue is addressed in more detail when we cover the discussion on talent.

Technology

Participants report that investments in technology have provided support to customer service/relations, quality/operational excellence, and strategic sense. For example, a construction firm noted that a key to success is providing customers timely information to make good decisions. That firm has invested in computers for modeling capability to provide cost information up front - at the point where people make the most important decision yet typically have the least information. A producer of industrial cranes reports that its investment in "Crane Brain," an

online tool that enables customers to design and price a crane customized to their needs, differentiates them from their competitors. Finally, an accounting firm that has adopted a niche/boutique growth strategy that involves providing services to clients around the nation commented that the mobility granted by technology has scrapped the industry norm that a geographic presence is necessary to serve a given area.

Organizational Design

Several participants commented on the fact that the design of their organization – the structures and processes through which work gets done – has enabled their source of competitive advantage. Indeed, one participant noted that his firm’s road to success started when he was able to create a flatter, dynamic, more responsive organization.

Connections

“When asked how they assess competitiveness, i.e., which tools and processes they use to identify and analyze course-altering market changes, 95 percent of respondents indicated that they participate in industry forums and associations.”

*From “Competition at the Crossroads”**

The discussions made it abundantly clear that successful business is a social process. Connections, networks and partnerships support every source of competitive advantage, although they appear to have particular importance in achieving a strategic sensibility. The connections and knowledge shared through trade shows, industry conferences, sector journals, and other forums are a key means of both marketing and learning. The constant scanning of sources of information – newspapers, trade journals, web sites and more – is another form of connection and learning. As one CEO put it, “Readers are leaders.”

Sector Collaboration: There is a vintners’ tasting group that meets monthly to have a common tasting and critique each others’ wines. The rule is they have to be willing to accept criticism and share lessons learned. The goal is to improve the region’s product.

The breadth and depth of relationships and venues that the participants cited as supporting their source of competitive advantage, and the lengths to which they would go to sustain these relationships, is almost staggering. Connections include networks of clients and feedback loops from clients; distributorships and sales representatives (cited by several as a key to international growth); a global alliance of accounting firms that supports collaboration and cooperation with other firms; relationships with

* “Competition at the Crossroads: Strategic Planning and Action in Disruptive Markets.” BPM Forum. 2007.

customers and suppliers (reflecting the importance of the value-chain); and links to the region's colleges and universities, important for both their cutting-edge research and as a talent pipeline. One participant summed up the importance of connections as follows: "We used to have the right product, the right technology, the right applications, but we did not know people (no right relationships). Now (a key to our success) we have the right people in the right places." Another simply stated, "Networking is huge!"

It is important to recognize that many of the connections in which these firms engage are sector specific. For example, when talking about connections to regional colleges and universities, the optics firms cited the University of Rochester's optics program as a key asset and connection. The biomed firms highlighted the University of Rochester's Medical Center and the new Translational Research Building. The manufacturers tended to highlight the Rochester Institute of Technology, particularly its co-op programs. The vintners cited Cornell University's agricultural research station as a critical connection. Other relationships – from trade associations and conferences to customers and suppliers and regional partners – also often reflect a sector-specific orientation.

Innovation

In the forums, we asked leaders the following question: "Many business leaders and analysts argue that innovation is the key to sustained competitive advantage. What factor does innovation play in your firm's current/future success?" The responses to this question suggest that innovation activity revolves around strengthening a company's source of competitive advantage, establishing additional sources of competitive advantage, and reinforcing the supports of competitive advantage. For example, a participant from an engineering and design firm talked about how the firm's "innovative financing techniques helped a community pay for a project it would otherwise not be able to afford, while matching projects brainstormed by engineers with funds to help realize those visions. This matching of projects to funds is an

integral part of the firm’s business model.” Investments in technology (a competitive advantage support) were one of the most cited innovations. Innovations also tend to directly support a company’s growth strategy.

For these successful firms, innovation is a part of doing business. As one participant articulated, “there is a recognition and/or decision to be proactive at learning about your market. You must develop new products and enhance existing products. You must just do it. You must also listen to customers and respond to their needs. Then, you take advantage of existing technology and leverage it around customer needs. You should also develop financial metrics to guide your decision about which technology to engage with.” Or as another stated, “Innovation is a part of the staff culture. It is important to have people learning and executing simultaneously.”

Business Challenges

The accelerating change that characterizes today’s economic environment makes it critical to pay attention to the future. In order to figure out what these firms saw as driving their future, CGR asked participants, “What are the top three challenges that your industry faces? How do these affect your company/how are you addressing these challenges?”* Four major themes emerged from this part of the discussion. These are: workforce, operations, markets, and business climate.

Workforce

Several of the participants saw attracting and/or retaining the appropriate talent as a major challenge for their company, but had different reasons for being concern with this issue. One concern relates to the difficulty of finding talent that “fits” with the firm’s business model or strategy. As noted above, successful firms are innovative, and by definition innovation involves a new way of doing things. Some of these companies find that individuals

* A second question -- “What are the drivers that will shape the industry in the next five years? How do these affect your company?” – was included in the agenda, but none of the groups had time to address this issue.

coming from a more traditional role have difficulty adapting to the new requirements. For example, one company that has a very different sales strategy, including compensation based on profit margin rather than volume of proposals, finds it hard to attract good sales talent. A second concern relates to the inability to find candidates with the right skills. This concern ranges from vintners having difficulty finding labor with specific skills (e.g., many of the Hispanic laborers have never driven a tractor) to a perceived void of multi-disciplined employees and young grads. The final concern raised involves the preparation of the next generation of the company's leaders and the transition of leadership. While this was of particular concern to a family-held firm, the issue of leadership development was a more general concern.

Operations

“Quality, Cost, Delivery used to be the mantra. We told customers they could pick two. All three are simply a given today.”

Several of the participating firms see the maintenance of quality and operational excellence as a challenge to their business strategy. For some, it is a question of the ability of the company to establish the operational capacity to meet their plans for growth. For example, one participant was concerned with his company's ability to execute their plan to double revenue in three years. He wondered if the firm would be able to support its dealers and provide its sales force with the necessary resources. For others, it is a question of making the changes in operations necessary to thrive in a changing market. Thus one participant noted that, “As we lose more manufacturing, those that are left will have to differentiate on service – faster, better, cheaper.” He saw that as a major challenge. At least one company saw the challenge not as growth, but as “improving the margins. We just want to be better at what we do.”

Markets

Several of the participating companies saw identifying and entering new markets as a significant challenge for their company. Manufacturers that used to be part of a regional supply chain but are now being forced to participate in a global supply chain seem especially likely to face this challenge. One noted, “Our market is industrial manufacturing and we are losing manufacturing firms. Our challenge is finding new markets. We are moving into

healthcare and transportation and shifting away from purely industrial.” Others are not as aggressive. For example, one firm noted the challenge of bringing in more opportunities, but lamented that, “Customers are moving to China or Mexico based on cost ignoring service and customer loyalty. They should look at total value versus cost.”

Business Climate

The forums were designed to focus on what regional companies are doing to be successful in a common and challenging business environment. We purposely tried to avoid the usual business laments around taxes, regulations and other factors. However, various elements of business climate are seen as a significant challenge by many of the participating firms. The tax and cost structure in New York was one element of the business climate seen as a challenge. One CEO went so far as to say, “New York’s cost structure is too burdensome. I do not see how I can afford to be here in ten years. I may have to consider moving the company.”

Growth requires investment and several participants saw access to capital as another challenging element in the business climate. The advent of global value chains was made possible through advances in telecommunications. Internet access is now a critical part of doing business, supporting activities from the processing of credit cards to advertising on the web. At least one firm in the rural part of the region saw a stable infrastructure for Internet access as a challenge to his business. Finally, the vintner in the forum noted that urban sprawl is a challenge to the wineries. He noted that, “People want to move to wine country, but developers are competing for the best land on which to grow grapes.” His concern highlights the need to link regional planning to economic development.

Talent

Workforce issues emerged unprompted at many points during the forums’ conversations. The forums also used the following question to elicit information on workforce issues: “Given your business plan and competitive environment, what roles/individuals are most critical to your firm’s success? Do you face any issues in recruiting, developing or retaining this talent?”

Three themes emerged from the ensuing discussion: the availability of talent, skill gaps, and the talent pipeline.

Availability of talent

The importance of talent makes these companies' continued success largely dependent on their ability to make sure they have the right people in the right place at the right time and at the right price. This section attempts to capture the wide-ranging discussion related to the availability of talent in the Finger Lakes region. It begins by focusing on company and/or regional strengths, and then turns to areas of concern.

Good Local Supply

Interestingly, many of the successful companies did not feel that finding talent was a major issue for their firms. Some have been able to draw on skilled labor in the local market, noting that the downsizing of larger firms in the region provides a significant pool of skilled labor. Thus, one participant commented on being able to “attract former Kodak and B & L employees,” another said he had been able to “cherry pick” staff from a former employer who since closed, and a third feels strongly that “there is a workforce available from Kodak through their downsizing” and he has not had trouble finding “good people.” He added that as a result, the “cost of labor is affordable in the short term.” Another participant from an optics company said that because of the University of Rochester and the dislocations from Kodak and other firms, “We have a lot of good optical engineers – this is a great place to recruit.”

Local Colleges and Universities

Many of these firms have not had to face workforce challenges as a result of the partnerships their firms have developed with local colleges and universities. However, almost all of the firms felt that the relationship between the colleges and universities and the region's small and mid-sized firms needs to be strengthened. As a group, they lament that the universities are not reaching out to small and midsize companies to come to campus and recruit. As one CEO put it, “the doors should be open to colleges and universities to rub shoulders with faculty and department heads in order to open the pipeline for college age recruiting and future

programs designed to fill those pipelines.” Participants had particular praise for the RIT co-op programs. They thought that the “Co-op at RIT is very significant because of the practical application of the program which allows students to know how to relate to people.”

Human Resource Investment

A final reason for these companies’ relative success in the workforce arena is the company’s Human Resource (HR) philosophy and the investment that these firms make in their HR practices to provide a work environment which enables them to attract and retain talent. One CEO from an accounting firm noted that, “Offering competitive salaries is usually not enough to attract talent, so we use intangibles, or “soft benefits,” like market niches (in health care), keeping hours reasonable during busy season (keep it at about 60 hrs/week), travel (e.g. China), quality of life, etc.” Another participant commented that his “staff can work from anywhere they want (home, or half-way around the world). All connectivity is available through their desktop. There is little on-the-job pressure. The company pays for 80% medical and dental and 100% of everything else.” He added that “I am a no experience required kind of guy – I like to grow internally and I am willing to train.” One small manufacturer noted that his company “had trouble recruiting several years ago when we accepted a lower level of skill.” They have not had a problem since they started paying more and demanding a higher level of skill. In addition, the company put in a quarterly profit-sharing plan that pays 15% of wages plus 5% for making quality goals and 5% for making on-time delivery. The firm also conducts full staff informational meetings every two weeks. Another small manufacturer even operates a company daycare facility.

Hiring for Fit

Another characteristic of these firm’s HR practices is the emphasis placed on hiring for fit as opposed to hiring for qualifications. One CEO was quite proud that his “critical people are hired based upon personality and overall fit as opposed to knowledge and know-how.” Another commented that his company’s “critical

people must match the overall corporate philosophy.” A third stressed that an “internal understanding of the company is important. Everyone should buy-in to the big picture. My vision is that we want to change the way healthcare is done. This keeps employees motivated.” This company also offers lots of employee perks geared to a small work environment.

Workforce Challenges: Supply and Wages

This does not mean that these companies face no workforce challenges related to the availability of talent. Several participants noted that while they have not faced any workforce issues, they are looming. One noted that his company “has not grown enough to hit issues, but we will soon.” Others noted a rise in the salaries required to attract good candidates. One CEO said that his “salary range has jumped 20% in the last 3 years for key engineers.” While others around the table said that was largely just correction and not due so much to the industry, the CEO felt that the supply of people is down. Others agreed that the competition for engineering is heating up. Between competition with the public sector, which is offering a lot of jobs with salaries higher than historical standard, and students being recruited to go outside of this area,* some participants expected to see a crunch in the engineering workforce over the next 15 years. At the moment, the fierce competition for software engineers, in particular, has driven up wages.

Other participants were able to identify specific positions for which their firm is having trouble attracting and/or finding qualified candidates. Three types of positions were identified as problem areas. The first are high-skill scientific and engineering positions, including mechanical, electro-mechanical, electrical, and civil engineers, software development, and architects. Some

* One participant argued, “It is a disservice to our region that the media emphasizes the 20 year olds leaving without emphasizing the 30 year olds returning.”

participants thought there was a shortage of supply in architecture and engineering graduates from college, while others were more concerned with their firm's trouble finding middle-experienced engineers and architects. The second problematic position was sales and business development (one participant noted that a good sales person can cover a lot of other problems). The final problematic area is a range of mid-level technical positions, the type of high-end technicians that typically require a 2-year engineering degree.

Recruiting to Rochester

Based on the discussion, one of the reasons that firms face challenges with these positions, particularly the high-end scientific and engineering positions, is the difficulty firms have in recruiting talent from outside of the region to the Rochester area. One CEO said he is "frustrated trying to bring talent to upstate. We cannot seem to attract good talent to this region. Higher-level positions don't want to come to Rochester." Another added, "There is a bad reputation in Rochester. People don't want to come." He suggested that, "Maybe it should be marketed as the Finger Lakes Region." (He also noted that "There is affordable housing, but it doesn't last too long when property taxes roll around.")

Three responses to this problem were identified. First, firms are forced to grow internally (which one CEO admitted is not necessarily bad). Second, firms try to find a person with local roots – that seems to help with long-term retention in the region. Third, firms strengthen their relationship with the regional colleges and universities as sources of talent.

While the current HR literature suggests that retention is a critical issue for companies, only one of the firms in the forums identified staff retention as an issue for their company. This CEO noted that his firm "goes through an 18-24 month production lag while people get trained, only to have the staff recruited elsewhere once they have obtained their certifications" (this is an IT services firm in which certifications are critical staff qualifications). He said they "are losing a lot of staff to customers and to other areas of the

country.” The CEO is using compensation, stock options and a lot of perks to keep people in the area and keep them motivated.

Skills Gaps

Even participants that did not feel they had a serious workforce challenge were able to identify skill gaps in the available workforce, missing competencies that kept candidates or current employees from being “just right.” For the most part, the lament around skill gaps pointed back to the learning institutions. These employers did not understand why these institutions could not do a better job preparing graduates to meet the requirements of the 21st century workplace. Confronted with the skill gaps, many employers have established training programs – on their own or in partnership with regional learning providers - to address staff skill deficiencies.

An array of skill gaps were identified by forum participants. These include:

- 1) Blended or multiple skill sets. One CEO noted that his firm needs “people who are well versed in multiple disciplines, but they are hard to find. People generally don’t have broad based experience.” Many of the examples of blended or multiple skill sets cited by participants tended to focus on a desire for engineers with more than technical skills. For example a blend of sales and engineering would produce a technical person able to work a deal. A blend of engineering and customer-service would produce a top-notch applied engineer. One CEO noted that his firm “Struggles to get staff ingrained with the need for customer support.” He added that, “a technical manufacturing person is easy to find, but an applied engineer is a struggle to find.” A blend of engineering and creativity would produce innovative design. One CEO who does not feel that dislocated employees from Kodak and other large firms are good candidates argues that these employees are used to doing routine work and have difficulty when asked to develop innovative solutions to meet customer requirements. The whole issue of blended skill sets is summed up by one CEO as follows: “We need people who can modify their thinking along the way. A myopic view of their world or the future creates isolation. We are looking for people who can see past their own specialty with

entrepreneurial mindsets. People must be driving the ship or they must get off.”

- 2) Leadership, especially with regards to project management;
- 3) The management of collaboration, a critical issue with the increasing importance of strategic alliances;
- 4) Problem solving: One participant commented that his company “Wants people to understand how to solve a problem. Engineers should not just have skills, but problem solving ability. They may not need multi-disciplinary skill sets, but they do need the ability to find answers they don’t know and ultimately solve a problem.”

Investing in Training

Emerging approaches to talent management emphasize identifying the competencies staff needs to achieve the corporation’s strategic objectives, assessing employee’s competencies to identify any gaps, and delivering training or learning experiences to fill those competency gaps in support of the corporation’s plan. While all of the forum participants may not have formal talent management programs, they implicitly recognize the importance of staff having the skills necessary to do the job, and they make the investments necessary to ensure staff attains the necessary competencies. Some have set up their own corporate university to train staff on technical components and expected behavior. Others partner or work closely with local universities to upgrade their workers’ skills. Others rely on outside consultants to help design and deliver the appropriate training.

A few participants had been the beneficiary of Wired and/or other training grants. One CEO went into detail on how these grants were helping to transform his company. The grants were used to: (1) introduce lean manufacturing, Kaizen, and provide “Training Within Industry” (TWI) at the plant level; (2) support professional development of the management team – time management, people management; and (3) enable specialized coaching for the general manager (who is being groomed as the CEO’s successor).

Three additional observations from the discussion on training deserve attention.

- 1) First, many participants are becoming aware of the graying of the workforce, although not all have started to address this issue. One of the first areas in which the need becomes apparent to companies is the need for leadership development so that the Baby Boomers can be replaced.
- 2) A second related observation is that the management training ground that had been provided by the large companies no longer exists. One CEO from a financial institution noted that, “There is no training ground for people in the banking industry anymore. Mergers have left small markets without feeders for key management positions. It leaves them to raise their own.”
- 3) Finally, there is a potential dilemma of scale that arises when a region thinks about addressing the skill gaps of small and mid-sized firms. Learning institutions require a certain number of students in order to justify the creation of a program. But the needs of small and mid-sized firms may not be of sufficient scale to justify the creation of a program. If the program is created, the region runs the risk of producing skilled workers that will leave the region to find employment.*

Talent Pipeline

While the employers that participated in the forums have been willing to make the necessary investments in training to ensure their firm’s success, there is a common belief that they are taking on some of the work that should be done by the secondary and post-secondary system. Employers that face the challenge of recruiting skilled technicians are particularly concerned with the lack of a clear and effective talent pipeline from the region’s secondary and post-secondary institutions. One participant noted that, “There is no current feeder group for skilled but not high-end labor,” adding that his firm has “started to draw from the

* One CEO from a winery expressed concern that this could happen with a new program at Cornell, which graduated its first class this year. He said the program may increase the depth of the labor pool, but unless the industry can grow more grapes, there will not be a demand for labor since vineyards need to be a certain size before they have a need for specific positions such as a vineyard manager.

Food Service Industry and teach them precision aspects of what they already know.”

One CEO notes that, “Universities and colleges are helpful, but we need to make sure there is a good pipeline.” Providing some history, he went on to say that “Back in the 50’s, Rochester Tooling and Machining Association (RTMA) brought together their members to form a school specifically designed to feed their workforce. Ultimately, a few years ago MCC built the Applied Technology Center to pick up the work of RTMA.” The current MCC program, however, received mixed reviews from participants, with some going so far as to suggest their own companies may need to create their own training/apprenticeship programs.

Game-Boy Generation

Most participants, however, would prefer to work with the secondary and post-secondary schools to develop a vigorous talent pipeline. One participant said that he “would really like schools to visit more often. I want to see kids get excited.” Participants agreed with one CEO who said that there needs to be an “attitude change among students when they come for education. Most young people don’t believe that things have to be made. The game-boy generation is sheltered from the reality of how things are made. They have been raised as consumers without insight into the world of manufacturing and what that requires.” He would like to see the machining program rebuilt, noting that “there is a strong infrastructure but that we need to help kids understand how to build things.” There was agreement that you feed a technical work force by cultivating the early phases of engineering interest. Participants argued this can best be done by focusing on secondary school and reinventing the “shop class.”

It is interesting to note that the firms that are most supportive of rebuilding the technical pipeline are also among the ones most aware that the graying population is a problem for them. They are having difficulty finding young talent and then transferring the knowledge from the established to the newer generation.

Other Comments From Forum Participants

As each forum drew to a close, participants were given the opportunity to offer a closing comment – one thing they would like to see noted in the report or an action they hoped would take place as a result of this study. Five themes emerged in the participants final comments: strategic focus, workforce, marketing the region, business climate, and leadership.

Strategic Focus

As a group, the participants identified two focal points for an economic development strategy: global marketing and entrepreneurship.

Global Marketing

The focus on the global market recognizes the breakdown of the local supply chain that had dominated the region in the industrial era. It also reflects a conviction on the part of the participants that regional economic success requires bringing wealth into the region, which requires exporting more from the region. While this may involve selling into national markets, the participants felt the region had to push itself to connect to global markets. As one CEO noted, “We need to help people locally understand the global marketplace.” Two specific recommendations related to the pursuit of global markets were to:

- 1) Benchmark target industries to provide regional business leaders a better sense of what is happening in terms of global markets and how to connect to these markets. The study should help identify emerging markets and recommend specific actions that can be taken to help regional firms connect to those markets.
- 2) Help regional firms to embrace new technologies for sales that allow firms to close deals without having to be face to face and thus strengthen a company’s ability to sell outside of the region.

It is important to note that there were some dissenting or contrasting views among the participants. Several participants believe the region should do more to encourage the use of local resources. One CEO noted that local businesses currently outsource or purchase 80% of their supplies or services from

outside of the region. These participants would like to see that number significantly reduced by promoting the use of regional resources.

Entrepreneurship

Acknowledging the breakdown of the local supply chain that dominated the industrial era requires recognizing that the region's economy is no longer dominated or determined by a few large firms. Rather, the region's economic success will be determined in large part by the type of small and mid-sized firms represented by the forum participants. The emphasis on entrepreneurship reflects a desire to create more successful small and mid-sized firms in the region. Forum participants believe that the region must do more to create an entrepreneurial spirit and mindset, an attitude which they feel is not embraced or fostered locally. They believe that particular attention should be paid to drawing on the region's university and corporate research assets to encourage high-tech start-ups. Since venture capital is critical to the formation of start-ups, the group recommended the reallocation of tax dollars to tax credits for those who invest in high-tech start-ups or any start-up and the formation of a State Venture Capital (VC) fund designed to match private VC money.

Establishing Metrics

As business leaders, the group recognizes the importance of measurement to achieving strategic objectives. They were quite vocal in their belief that the region needs to adopt a set of metrics that are more in-line with the economic development strategies presented here. For example, one CEO suggested the region track and report on the increase in net dollars imported due to regional exports. The group was particularly adamant about the need to break the infatuation of economic development with job creation, noting that the number of jobs is not a measure of the value or quality of jobs. Education and workforce was another area that the group felt needed better metrics to assess the degree to which the learning system was supporting the development of the talent needed to grow the regional economy, although no specific metrics were offered.

Workforce: Creating a Talent Pipeline

Creating a talent pipeline was the dominant issue related to workforce in the final comments. There were three requirements identified by firms in order to achieve the goal: focus on secondary schools, launch a broader public relations initiative, and improve the connections and interaction between business and the region's colleges and universities. Each of these will be discussed below.

Focus on Secondary Schools

The group believes that ensuring its future workforce requires a focus on secondary schools. The region needs to connect schools to industries in order to provide children a vision of what career opportunities are available in the region. These connections should enable students to visit companies at young ages to learn about career possibilities, as well as support experiential learning at the high school level that draws on problems in regional companies and industries. The objectives for such a talent pipeline initiative are secondary school graduates that have solid foundational skills (e.g., math, literacy), good “soft skills” (e.g., problem solving, teamwork, communication), character (e.g., responsibility, accountability, and respect), and are knowledgeable and excited about the region's career opportunities.

Launch a Broad Public Relations Initiative

But improving the connections between schools and businesses is not enough. The group recommends a broader public relations (PR) initiative to showcase the career opportunities in the region. This might include success stories on firms and school/business partnerships, as well as small exhibits in shopping malls to reach youth in their place of recreation. The manufacturers, in particular, were convinced that a PR push was needed to remove the stigma of manufacturing. They believe that people need to realize manufacturing is now very high-tech and that individuals can make a very good living in manufacturing.

Improve Connections with the Region's Colleges and Universities

While the creation of a talent pipeline requires a focus on secondary schools, ultimately taking full advantage of the region's

talent also requires improving the connections and interaction between business and the region's colleges and universities. Programs and courses are not the focus of these improved connections. As one CEO noted, there is "no value in courses. There is more value in networking events with university department heads and faculty. Our schools are our competitive advantage. We will prosper as we connect with our universities." The leaders noted that "Universities don't necessarily go to businesses and (we) need to bridge that divide."

Other Issues

Other issues that emerged in the final comments related to workforce include: (1) a request for flexible training grants that enable a company to train one or two people (there was a common perception that the Wired grants require larger groups of enrollees) and a reduction in the paperwork required; (2) a recommendation for programs to assist skilled labor that is in transition; (3) a recommendation that efforts be targeted at those firms whose leaders are not only good, but have the desire to be great/grow (alternatively, the development of leadership programs around the idea of growth and potential); (4) a recommendation that the region support the use of professional recruitment services to address the difficulties firms have in recruiting individuals to the region; and (5) a recommendation that the region weigh in on immigration reform by advocating for an increase in the number of H1-B visas made available annually in the United States.

One CEO that had received a Wired grant used his final comment to express his thanks to Wired. He said that the grants have allowed his company to stay robust and competitive.

Marketing the Region

There was consensus in the group that Rochester has an image problem. These leaders are convinced that Rochester has the assets, but it needs to do a much better job communicating and selling the region (and one CEO added, "Despite the poor tax structure"). They feel GRE, the county and the city each need to step up their efforts to tell the region's story.

The group agreed that the marketing campaign has to market the region in a more positive light, emphasizing the bright spots in the community and the region's many assets (e.g., the infrastructure is in place, the fact that people want to live here and like it here, the universities, the workforce). The campaign should enable Rochester to compete with other similar areas, and should be targeted at business and talent both outside and within the Finger Lakes region. The group emphasized the internal marketing of the region, noting the negative perception of Rochester that pervades the community has to be overcome. One participant summed it up this way: "The people who live here need to believe in Rochester."

Business Climate

Several participants used their final comments to reiterate the need to improve the local business climate in New York State. Improving the effectiveness and efficiency of local government through consolidation and/or privatization of schools and services received the most emphasis. One participant noted that the goal is to cut spending, not taxes, and to reallocate tax money to initiatives that will grow the economy.

One participant said that the region needs to improve air travel by providing more direct flights to more regional cities.

Leadership

The leadership or lack of leadership in economic development is the last area to which participants devoted their final comments. The group expressed confusion regarding "Who is in charge of economic development?" They noted that there are, "Too many oars in the water," resulting in "too much competition and not enough collaboration." The group believed that the competition between economic development entities for limited resources reduced the amount of resources actually made available to the companies that are supposed to be the beneficiaries of economic development programs and activity. The participants would like to see more outreach to companies, easier access by companies to available resources, and more resources actually going to companies.

“Don’t help us, just learn from us!”

There was general consensus that for this to happen, the “Private sector needs to take development into their own hands, instead of having the public sector identify and solve problems.” While some participants felt that governmental and/or quasi-governmental entities may play a role in facilitating “a consortium of business leaders, similar to the forums CGR is holding...to do the job the public sector is trying to do,” other participants wanted government to “stay out of the way.” At least one participant was confident a consortium of business leaders would produce a “convergence of insight” inaccessible to government due to its fragmentation and competition. The group recognized that quasi-governmental entities such as GRE and Rochester Works can and should play an effective and necessary role in coordinating services.

Two other cautions were expressed regarding leadership. One was that, “Economic growth should be spurred through local initiatives and not federally funded. Any growth achieved through federal funds cannot be sustained once they are depleted.” The second was a “need...to bridge Buffalo, (Rochester) and Syracuse with the rest of the State.”

Participating Companies and Entities

Company	Industry	Product/Market	City
Advanced Interconnect Manufacturing	Advanced Manufacturing	Contract manufacturer of wire harnesses	Rochester
Ameritherm	Advanced Manufacturing	Radio frequency induction heating of parts	Scottsville
ASE Optics	Optics/Imaging	Outsourced R&D optics, commercialization of technology	Rochester
Bergman Associates	Service	Engineering and architecture, multiple clients	Rochester
Brand Orchard	Optics/Imaging	Marketing service for optics/photronics firms	Pittsford
Canfield & Tack	Advanced Manufacturing	Printing; wine industry major client	Rochester
Clark Patterson Associates	Service	Engineering and architecture, community development	Rochester
CMS Consulting	Service	Consult on quality systems and continuous improvement; regional market, non-profit, healthcare, advanced manufacturing clients	Mendon
Conserve	Service	Accounts receivable; colleges and universities major market	Fairport
Corning Tropel	Optics/Imaging	Laser optics, precision optics, metrology instruments	Fairport
EMRT	IT	Help companies implement pervasive/embedded computing (machine to machine)	Pittsford
Fox Run Vineyards	Agribusiness	Wine	Penn Yan
Gorbel	Advanced Manufacturing	Lifting equipment for industrial applications	Fishers
GR Bank	Service	Community bank; target high-end small business	Rochester
iCardiac	IT	Technology for improved reading of EKG, pharma companies	Rochester
Impact Technologies	Service	Diagnose equipment problems and predict future maintenance needs	Rochester
LaBella	Service	Started as civil service, now full service design	Rochester
Litron	BioMedical	Test kits and service to test for micronuclei in blood	Rochester
Lumetrics	Optics/Imaging	Metrology (micro-measurement), clients are in medical devices	West Henrietta
MRB Group	Service	Engineering (in competition with LaBella)	Rochester
New Scale	Advanced Manufacturing	Mini-ceramic motors used in cellphones and cameras	Victor
NF Associates/Kenda	Service	Staffing, white collar with IT focus	Rochester
Optimation	IT	Design, build and maintain industrial complexes; It at core (20%), 80% other services. Started in manufacturing, now in medical, embedded devices, pharma	Rush
Optimax	Optics/Imaging	Precision optics; small volume high-end products	Ontario
OptiPro Systems	Optics/Imaging	Distribute machine tools, developed own 3 access milling machine, applied to optics sector	Ontario
Pictometry	Optics/Imaging	GIS mapping and pictures; county assessors, Microsoft, counties	Rochester
Pike Company	Construction	General contracting (35%) and construction management (65%)	Rochester
QED	Optics/Imaging	Magnetic reologic fluid used for precision grinding of lens; developed measurement device to support	Rochester
Rochester Software Associates	IT	Core in digital printing software; went from translation programs to on-demand on-line printing and mailing for large organizations	Rochester
Rotenberg & Co	Service	Accounting	Rochester
RTEMed	BioMedical	Software for medical systems/equipment; new product development, software enhancements, and validation/verification	Pittsford
SWBR	Service	Architects -- housing, institutional, corporate/industrial; Local client base	Rochester
Synergy	IT	Computer systems -- from reseller to service center (call center) for computer firms (Ingram Micro)	Pittsford
Trident Precision Manufacturing	Advanced Manufacturing	Machining; early products focused on printing, now diversified; Realization of core competency "To own the process of making the parts, not just making parts". Driven by knowing the process and knowing what it can yield. Market is aerospace and defense	Rochester
VI Manufacturing	Advanced Manufacturing	Precision sheet metal	Webster

Prioritizing the Recommendations

Finger Lakes Wired has a limited amount of time, money and other resources. Given a list of recommendations, each with merit, the question is, “What do we do first?” A variety of criteria may be used to prioritize the recommendations. Factors typically considered in setting priorities include:

Concepts to Consider in Prioritizing Recommendations

- ❖ Impact – How big an effect will the implementation of this recommendation have? How many companies and/or individuals are likely to be affected? What is the depth of the effect? A second dimension to impact is whether it is achieved directly or indirectly, i.e., does someone have to undertake an additional action to produce the desired effect?
- ❖ Time frame – How long will it take to see the desired impact?
- ❖ Cost – How much will it cost to implement the recommendation?
- ❖ Difficulty – How difficult will it be to implement this recommendation? How many players are involved? How much support is there for the action? How complex is the task?

Rating the recommendations on the criteria is a step towards prioritization. It provides information that can be used in setting priorities. Other considerations in setting priorities include:

- ❖ Importance of each criterion – Different organizations may assign different weights to specific criterion. For example, organizations with few financial resources may consider cost the most important factor, while organizations looking for quick results may assign time the highest weighting. Finger Lakes Wired has to determine which criteria it considers most important in its next implementation phase.
- ❖ Interdependence – Often, recommendations build off one another. If that is the case, you need to implement the recommendations together or in a specific order. For example, recommendation 7 (Continue and enhance ongoing opportunities for the dissemination of key knowledge) was meant to build off of recommendation 6 (Develop a database of critical resource providers and supporting information). As a consequence, recommendation 6 should be implemented before recommendation 7.

*CGR's Suggested
Priority
Recommendations*

- ❖ Strategy – Finger Lakes Wired should view the recommendations through two different strategic lenses. The first lens is Wired’s strategic plan. How do Wired’s current initiatives relate to the recommendations? The second lens is a change management lens. Is there an ordering to the recommendations that will make it easier or more difficult to implement the entire set of recommendations?

CGR has identified six of the fifteen specific tasks as high priority. In doing so, CGR gave highest weighting to the impact criterion. This was balanced against a change management strategy that suggests starting with some high-impact, short time-frame, low-cost initiatives to demonstrate quick success, while simultaneously investing in high-impact, longer time-frame, higher-cost initiatives to build toward the future. We also tried to take into account the value of implementing the recommendations in some order (e.g., recommendation 6 before recommendation 7).

In the area of developing management competencies, CGR rates both recommendations 2 (Encourage business leaders to learn from other successful business leaders) and 3 (Support managerial development across sectors) as high priority. These are seen as quick hits that can establish a foundation for other sector and cross-sector initiatives. In the area of developing technical competencies, CGR rates recommendations 4 (global benchmarking) and 5 (talent pipeline) as high priority. These are longer-term initiatives that will help link regional firms to global value chains and ensure a skilled future workforce. Finally, from the area of enabling competencies, CGR rates recommendations 6 (Develop a database of critical resource providers and supporting information) and 8 (Establish a vehicle to provide companies with access to competitive intelligence on markets, customers, and competitors) as high priority. There appears to be strong support for recommendation 6. It is also a building block for additional activity. Recommendation 8 will help link regional firms to global value chains and fills a perceived gap in the region’s business services.

This is not to suggest that these six tasks should be the first six for Finger Lakes Wired to implement. CGR strongly encourages

Finger Lakes Wired to develop its own rating of the recommendations using the criteria CGR has identified and the additional considerations noted above.

CGR has provided a table on the next page with its assessment of the potential impact, time frame, cost, and difficulty in implementation for each recommendation.

Area	Recommendation	Impact	Time frame	Cost	Difficulty	Priority
Developing Management Competencies	1: Celebrate and share management achievements across sectors	M/I	M	L	L	M
	2: Encourage business leaders to learn from other successful business leaders	H/I	S & L	L	L	H
	3. Support managerial development across sectors	H/I	S & L	L	L	H
Developing Technical Competencies	4: Facilitate development of technical competencies, market intelligence & networking					
	Global benchmarking	H/I	L	M	M	H
	Regional marketing	M/D	L	M to H	M	M
	Sector conferences	M/I	S & L	L to M	L	M
	5: Adopt competency management as the platform for workforce strategy					
	Talent pipeline	H/D	L	M	M	H
	Align learning outcomes with workforce competency requirement	H/D	M to L	M to H	M to H	M
Regional recruiting campaign	M to H/D	M	M to H	M to H	M	
Promoting Enabling Competencies	6: Develop a database of critical resource providers and supporting information	M/I	S	L	L	H
	7: Continue and enhance ongoing opportunities for the dissemination of key knowledge	M/I	M	L to M	L to M	M
	8: Establish a vehicle to provide companies with access to competitive intelligence on markets, customers, and competitors.	H/D	M to L	M	M	H
	9: Work with Rochester Area Colleges to provide a coordinated regional response to sector workforce needs	H/D	M to L	M to H	M	M
	10: Focus attention on the dissemination of knowledge from Universities to the marketplace	H/I	M to L	M to H	M to H	M
	11: Establish a vehicle for two-way communication between training providers and business firms supporting immediate training needs	H/D	S	M	M	M

Impact = High, Moderate, Low and Direct, Indirect

The rating tries to assess the number of companies likely to be affected and the magnitude of the effect. The second consideration is whether it is achieved directly or indirectly (most of what we recommend has an indirect effect – someone has to undertake an additional action to have an effect).

Time frame = Short, Moderate, Long

The rating relates to how long it would take to see the impact (roughly, S = Within 6 months, M = 6 to 18 months, L = Over 18 months). The “S&L” rating is because an individual could take something away from a conference to use immediately (S) and/or make some connection that only comes into play at a later date (L).

Cost = Low, Moderate, High

Dollar ranges are highly subjective but may fall into the following guidelines: L = Under \$75K, M=\$75-150K, H = Over \$150K

Difficulty = Low, Moderate, High

Professional Assessment based upon the number of players involved and the complexity of the task.

Priority = High, Moderate, Low

An assessment at some high impact, low cost initiatives that would provide a relatively good place to invest immediately, contrasted with high impact, higher cost initiatives and so forth.

Center for Integrated Manufacturing Studies (CIMS) Survey Analysis

The Center for Integrated Manufacturing Studies (CIMS) shared with CGR the survey response data collected during the project entitled “Roadmap for Revitalization of Upstate New York Manufacturing.” The survey response data was provided to CGR without any company identifying information and consisted of only the information that would be most relevant to the planned CGR analysis. The references in this report draw on the data set referred to as Four Cluster Data, which combines four clusters: Materials Processing (MP), Industrial Machinery & Systems (IMS), Food Processing (FP) and Optics and Imaging (OI) as defined by the cluster study conducted by Empire State Development.

The geographic area represented by the survey response data varies depending on the cluster. For the MP and IMS clusters, there is representation from the nineteen counties in Western New York, Central New York, the Southern Tier, and part of the Mohawk Valley*. For the FP and OI clusters, the representation includes all the regions of the MP and IMS clusters, as well as the Finger Lakes (FL) region. The table below describes the observations and response rates in the Four Cluster Data.

Four Cluster Data Observations			
<u>Cluster</u>	<u>Geographic Region Included</u>	<u>Number of Respondents</u>	<u>Response Rate</u>
Food Processing (FP)	19 counties plus FL region	24	12%
Optics and Imaging (OI)	19 counties plus FL region	30	19%
Materials Processing (MP)	19 counties	35	12%
Industrial Machinery and Systems (IMS)	19 counties	57	14%
Total		146	

* The counties included in each of the regions are as follows: Western New York: Chautauqua, Cattaraugus, Allegany, Steuben (Erie and Niagara were added later but were not included in this round of surveys); Central New York: Oswego, Cayuga, Onondaga, Cortland, Madison; Mohawk Valley: Oneida; Southern Tier: Steuben, Schuyler, Chemung, Tompkins, Tioga, Broome, Chenango, Otsego, and Schoharie.

Analysis of the Four-Cluster Data

The analysis of the surveys used for these four clusters focused on six issues: Competitive advantage and disadvantage; geographic distribution of customers and suppliers; management practices; human capital; innovation (activity level and barriers to); and collaboration partners. The main purpose of the analysis was to determine if we could learn anything through observed differences between high and low performing firms -- defined by increases or decreases in profit and changes in per-worker revenues between 2000 and 2004 -- across the six issues. We also looked at responses in relation to industry clusters. It should be noted that we used only the data provided which represents self-reported changes in the categories as defined above.

When conducting the profit analysis, CGR omitted the 13 cases where the firm stated that their 2000 profits were identical to the profits reported in 2004. For the change in per-worker revenue, CGR omitted the 24 firms that reported having the same revenue per employee in 2004 as compared to five years earlier. The result of our findings show a moderate positive correlation (.592) between the change in revenue per employee in the five years previous to 2004 and the change in profits for the company between 2000 and 2004.

The remainder of this appendix focuses only on the survey questions within each issue where statistically significant differences were found between high and low-performers or across clusters (unless stated otherwise).

Competitive Advantage and Disadvantage

According to the survey, firms were asked whether they had an advantage, were equal to, or had a disadvantage over 12 categories as compared to their main domestic and foreign competitors. CGR chose to aggregate the domestic and foreign data by asking whether the firm reported an advantage or disadvantage in either foreign or domestic without having a corresponding disadvantage or advantage for the respective response. CGR then analyzed the differences between the firms' beliefs of their competitive advantages and disadvantages using revenue per employee, profit changes between 2004 and 2000, and industry clusters.

Differences by Revenue per Employee

The table below highlights the categories in which there were statistically significant differences for the high and low performers in terms of revenue per employee. Three times more high

Percent of Respondents, By Revenue Per Employee Since 2000 Reporting Having an Advantage or Disadvantage in...		
n = 110	<u>2004 Revenue Per Employee is...</u>	
	<u>Higher</u>	<u>Lower</u>
Advantage...		
Cost Structure	22%	7%
Financial Strength	33%	14%
Product Prices	22%	7%
Marketing Skill	32%	14%
Disadvantage...		
Product Prices	22%	7%

Respondents could select multiple categories

performers say that they have an advantage in cost structure (22%) and product pricing (22%) than low performers (7% for both). High performers were also more likely to report that financial strength was an advantage they displayed relative to their main competitor (33%) than low performers (14%). High performers were also significantly more likely to say that their marketing skill (32%) was an advantage than low performers (14%). Interestingly high performers also listed product prices (22%) as a disadvantage more

often than low performers (7%) which may show that high performers are more tuned into their advantages and disadvantages or are more willing to acknowledge their disadvantages wherever they may appear.

Differences by Profit Performance

Two-thirds of low performers record having a disadvantage in cost structure versus 47% of high performers. This is the only significant difference between the two groups. Even though profit and revenue per employee are positively correlated, CGR did not find statistically significant results for the same questions when analyzing advantages and disadvantages by profit performance.

Differences by Cluster

There were several key statistically significant differences in firms' perceived advantages and disadvantages when the data was split between the four industry clusters. Food processing was more likely to report having disadvantages in engineering capability and product features than the other groups. Industrial machinery & systems reported having greater levels of product quality than all but the optics and imaging cluster. Optics and Imaging was more likely than the other groups to report having advantages in engineering and equipment capabilities, as well as product quality and pricing. This is not surprising with the strong optics and

imaging business sector located in the region. They were also more likely to report disadvantages in pricing and order turn-around than the other groups. The table below discusses these differences.

Percent of Respondents, by Industry Cluster Reporting Having an Advantage or Disadvantage in...

n = 146	<u>Food Processing</u>	<u>Industrial Machinery and Systems</u>	<u>Materials Processing</u>	<u>Optics and Imaging</u>
Advantage...				
Engineering Capability	13%	37%	26%	53%
Equipment Capability	17%	21%	37%	47%
Product Quality	42%	68%	57%	70%
Product Prices	4%	19%	11%	33%
Disadvantage...				
Engineering Capability	29%	16%	20%	3%
Product Quality	13%	0%	9%	3%
Order Turn-around	0%	7%	6%	23%
Product Prices	4%	19%	11%	33%
Product Features	21%	2%	3%	3%

Respondents could select multiple categories

Customers and Suppliers

The survey asked a set of questions that allowed respondents to share information in percentage terms related to where their customer sales dollars were generated from and where their dollars were spent with suppliers. CGR analyzed what percentage of 2004 total sales dollars came from customers in New York State, other domestic and/or foreign regions and where their suppliers were located using the same regional criteria. In doing so, we omitted the results from companies where the three regional percentages did not add to 100%. The only statistically significant findings in this analysis were related to the clusters. We report the data below in terms of profit performance and cluster difference to give some context to the analysis.

Differences by Profit Performance

There appears to be no statistically significant difference between the areas in which high and low performers draw sales from customers (NYS, other domestic, and foreign) and in the percent share of their dollars that are spent with suppliers in a particular region. The table on the following page provides the distribution

of customers and suppliers among the respondents for your information. You will note from the following table that there are differences between the groups, but they do not represent statistically significant differences.

Differences by Cluster

The table below shows the distribution of responses by cluster.

Customers and Suppliers Based on Firm Cluster				
	<u>Food Processing</u>	<u>Industrial Machinery and Systems</u>	<u>Materials Processing</u>	<u>Optics and Imaging</u>
Percent of 2004 Total Sales Dollars Came from Customers in...	n = 23	n = 56	n = 34	n = 28
New York State	55%	46%	52%	31%
Other Domestic	43%	46%	43%	53%
Foreign	2%	7%	5%	15%
Percent of 2004 Purchase Dollars was Spent with Suppliers in...	n = 20	n = 54	n = 33	n = 28
New York State	52%	55%	52%	46%
Other Domestic	41%	42%	42%	44%
Foreign	7%	3%	6%	10%

Totals may not add to 100% due to rounding

There was a statistically significant difference among the clusters in the percentage share of sales dollars from foreign customers and a slight but significant difference among the groups for percentage share of sales dollars from NYS customers. The Optics/Imaging cluster was by far the highest, in terms of foreign customers (percentage of sales). There was

also a slight but significant difference in the percentage share of purchase dollars spent with foreign suppliers among the four clusters. The Optics/Imaging cluster is by far the highest user of foreign suppliers.

Management Practices

The survey offered respondents an opportunity to share about their management practices with 13 different questions. These questions dealt with issues of strategy and business planning,

Efficiency Performance Documentation and Sharing Based on Change in Revenues Per Employee vs 2000

	% of Respondents that answered yes	
	<u>2004 Revenues Per Employee are... Higher</u>	<u>Lower</u>
Is the Efficiency Performance Regularly Documented	n = 81 67%	n = 29 41%
If so, Is This Information Shared With Employees	n = 54 91%	n = 12 58%

forecasting, marketing, and efficiency performance among other things. CGR did not find any statistically significant differences between high and low performers in relation to changes in profit between 2000 and 2004.

The results that follow highlight the significant findings based upon revenue per employee and cluster.

Differences by Revenue per employee

Referenced in the table above, the analysis found that two-thirds of higher performers relative to 41% of lower performers report regularly documenting their efficiency performances. Of the firms

who said they documented efficiency performance, 91% of the high performers share the results with all employees. Only 58% of low performers who document efficiency performance share it with their employees. Another finding was that 57% of high performers report systematically applying efficiency improvement methods such as lean manufacturing compared to only 38% of low performers.

Differences by Cluster

We would not expect many differences in this category by cluster, and there were not many. The only significant difference was in terms of whether the company's strategic business plan includes a marketing section. For those who indicated they had a strategic business plan, a lower proportion of IMS firms include a marketing section than the other three clusters. IMS still had 70% of companies report they had a marketing plan (but the other three clusters had 90% or higher, with MP having 100%).

Human Capital

The survey asked a variety of questions that offered respondents an opportunity to rate the quality of the regional labor supply (noting that this includes the regions outlined in Table 1 of this appendix and not just the Finger Lakes). In addition, firms were asked to share whether their labor force had grown or declined between 2000 and 2004. Analyzing the results based upon revenue per employee, profit performance and industry cluster, CGR found some statistically significant results as reported below.

Differences by Revenue per Employee

Over half of high performers (58%) again stated that the quality of the unskilled labor they need was excellent or good and 65% of the low performers believe that the quality is fair or poor. Similar results were achieved for the question of whether the firm had more or less employees in 2004 versus the year 2000. 66% of high performers reported having higher or the same number of employees versus lower performers who had 69% report that they have a lower number.

Differences by Profit Performance

Over half of high performers (62%) said that quality of the unskilled labor force is excellent or good. On the other hand, 59% of low performers reported that the quality of the unskilled labor

force is fair or poor. Other findings include that 59% of high performers report having a higher number of employees in 2004 relative to 2000 while 69% of low performers responded that they had a lower number of employees.

Differences by Cluster

The food processing cluster showed a significantly lower response relating to the question of whether the region had an excellent or good quality of engineering or design workers. After removing the food processing category, the difference between the other three clusters did not prove significant. A potential caveat to this

Percent of Firms Active in Innovative Process, by Change in Profits since 2000

	Number of Respondents	2004 Profits are...	
		Higher	Lower
Improved Existing Products	115	89%	73%
Business Model	112	67%	47%
Active with innovation enabler...			
Competitor Product	123	59%	44%
Benchmarking			
Industry Conferences	125	64%	39%

Respondents could select multiple categories

finding and the reason for removing them was that a large number of food processing employers did not answer the question and of those that answered, 5/7 answered fair or poor. A potential conclusion of these findings is that engineering and design is not a very important job function for the industry and/or they can not attract good talent to their industry.

Innovation

Respondents were offered the following definition of innovation on the survey: "Innovation is the transformation of knowledge, internally or externally developed, into new products, processes, services or business models. Innovation is not simply invention." Based upon this definition, respondents were asked to rate themselves as being active or inactive in relation to new products and processes. In addition, there were questions that focused on barriers related to innovation and also questions related to innovation enablers. The statistically significant results of CGR's analysis are reported below according to high and low performers in revenue per employee, profit performance and then by industry cluster.

Differences by Revenue per Employee

High performers were more likely to be innovating new products (78%) than low performers (60%). Low performers were therefore twice as likely not to be innovating new products. 90% of high performers report being active or very active in improving

existing products as opposed to only 2/3 of low performers. These results are also consistent for firms innovating new processes. High performing firms are more active with innovation enablers with 71% of high performers active in new product development as compared to 50% of low performers. High performers are also much more likely to attend industry conferences (59%) than low performers (37%). The table to the left highlights these findings:

Differences by Profit Performance

High performers in terms of profit performance were 20% more likely to report innovating their business model. The common way to interpret this is that businesses that were successful in terms of profit growth from 2000 to 2004 modulated their business plan to accommodate new products or processes in line with their experience and undoubtedly their forecasting. Higher performers were also more likely to use innovation enablers such as industry conferences and competitor product benchmarking. See the table to reference these results.

Differences by Cluster

Optics and imaging as well as industrial machinery & systems were more likely to innovate new processes than the food and materials processing clusters. As referenced in the table below, there was a

Percent of Firms Active in Innovative Process, by Change in Revenue per Employee since 2000

	Number of Respondents	2004 Revenue Per Employee is...	
		Higher	Lower
New Products	102	78%	60%
Improving Existing Products	101	91%	67%
New Processes	103	89%	67%
Improving Existing Process	103	95%	77%
Business Model	96	71%	42%

Respondents could select multiple categories

significant difference between the clusters in terms of their use of innovation enablers with the food processing and optics and imaging clusters reporting higher participation in all enabler categories.

Collaboration

Of particular focus in this section were the types of collaboration utilized by respondents as well as the actual collaboration partners. CGR's goal was to gain a broad sense of whether higher performers are more active in engaging collaborative partners than low performers.

Differences by Revenue per Employee

High performers were nearly twice as likely to innovate with consultants (35%) than low performers (17%). They were also more likely to collaborate with industry associations on workforce development (51%) than low performers (28%)

Differences by Profit Performance

Low performers were more active in collaborating with equipment suppliers (75%), materials suppliers (91%) and customers (98%) than high performers (54%, 73%, and 88% respectively). High performers, on the other hand, were more likely to collaborate

Percent of Firms Active in Innovative Process, by Industry Cluster

	Number of Respondents	Food Processing	Industrial Machinery and Systems	Materials Processing	Optics and Imaging
New Processes	135	64%	82%	74%	96%
Active with innovation enabler...					
Trade Shows	139	74%	37%	32%	79%
Competitor Product Benchmarking	138	70%	42%	51%	64%
Technology Licensing	137	14%	9%	3%	32%
Trade Associations	138	91%	48%	66%	71%
Industry Conferences	140	87%	33%	51%	64%

Respondents could select multiple categories

with universities and colleges, and more likely to collaborate with the higher education institutions on applied technical research than low performers. See the table below that highlights these findings:

Differences by Cluster

All clusters other than materials processing reported being relatively active in collaborating with universities and colleges.

Percent of Respondents, by Profit Change Since 2000, Reporting Being Active in Collaboration With...

	Number of Respondents	2004 Profits are... Higher	Lower
Equipment Suppliers	123	54%	75%
Materials Suppliers	123	73%	91%
Customers	122	88%	98%
Universities and Colleges	121	35%	16%
Applied Technical Research with Universities and Colleges	125	31%	11%

Respondents could select multiple categories

These findings are not that surprising. The optics and imaging industry were also much more active in collaboration with government labs than the other three clusters. As would be expected, the optics and

imaging and food processing clusters were active in the applied technical research field with colleges and universities particularly since Cornell and the University of Rochester are willing collaborators in those two fields.

Differences in High Performers vs. Low performers: The CIMS Data

Revenue per Employee

Three times more high performers say that they have an advantage in cost structure (22%) and product pricing (22%) than low performers (7% for both). High performers were also more likely to report that financial strength was an advantage they displayed relative to their main competitor (33%) than low performers (14%). High performers were also significantly more likely to say that their marketing skill (32%) was an advantage than low performers (14%). Interestingly high performers also listed product prices (22%) as a disadvantage more often than low performers (7%).

Competitive Advantages & Disadvantages

Two-thirds of higher performers relative to 41% of lower performers report regularly documenting their efficiency performances. And of the firms who said they documented efficiency performance, 91% of the high performers share the results with all employees while only 58% of low performers who document efficiency performance share it with their employees. Fifty-seven percent of high performers report systematically applying efficiency improvement methods such as lean manufacturing compared to only 38% of low performers.

Management Practices

Profit Performance

Two-thirds of low performers record having a disadvantage in cost structure versus 47% of high performers.

Revenue per Employee

Workforce

Over half of high performers (58%) stated that quality of the unskilled labor they need was excellent or good. 65% of the low performers believe that the quality is fair or poor.

Innovation

High performers were more likely to be innovating new products (78%) than low performers (60%). Low performers were therefore twice as likely not to be innovating new products. 90% of high performers report being active or very active in improving existing products as opposed to only 2/3 of low performers. These results are also consistent for firms innovating new processes. High performing firms are more active with innovation enablers with 71% of high performers active in new product development as compared to 50% of low performers. High performers are also much more likely to attend industry conferences (59%) than low performers (37%).

Collaboration

High performers were nearly twice as likely to collaborate with consultants (35%) than low performers (17%). They were also more likely to collaborate with industry associations on workforce development (51%) than low performers (28%)

Profit Performance

Over half of high performers (62%) said that quality of the unskilled labor force is excellent or good while 59% of low performers reported that the quality of the unskilled labor force is fair or poor.

High performers are 20% more likely to report innovating their business model. They are again more likely to use innovation enablers such as industry conferences and competitor product benchmarking.

Low performers were more active in collaborating with equipment suppliers (75%), materials suppliers (91%) and customers (98%) than high performers (54%, 73%, and 88% respectively). High performers, on the other hand, were more likely to collaborate with universities and colleges, particularly in relation to applied technical research, than low performers.

**Comparisons of
Current Wired
Activities to CGR's
Recommendations**

After hearing a presentation on the result of CGR's research, the Finger Lakes Wired operations committee asked the Wired leadership to prepare a table that compared current Finger Lakes Wired activity to the recommendations in CGR's report. CGR agreed to append the resulting matrix to the final version of its report. The table on the next page is included to help with the planning and assessment of current and future Wired activities, given the recommendations provided in this report.

CGR Recommendation	Finger Lakes Wired Activity	Description
1. Celebrate and share management achievement across sectors.	<ul style="list-style-type: none"> • The Golden Horseshoe Business Challenge • The Entrepreneurs Network • Entrepreneurship & Strategic Growth Immersion Sequence Program • Regional Cluster networks 	<ul style="list-style-type: none"> • Stimulate new company formation and regional networking • Networking & education for early stage company founders/CEOs • Promotion and acceleration of scalable regional businesses • Industry and cross industry networking idea exchange
2. Encourage business leaders to learn from other successful business leaders.	<ul style="list-style-type: none"> • GRE to coordinate Cluster networks sessions • Finger Lakes Winery Business Training & Support Program 	<ul style="list-style-type: none"> • Industry and cross-industry best practice exchange • Business and finance training for owners and key staff
3. Support managerial development across sectors.	<ul style="list-style-type: none"> • Technology Commercialization initiative focus on CEO development • The Entrepreneurs Network • Entrepreneurship & Strategic Growth Immersion Sequence program • SBIR/STTR (Small Business Innovation Research Outreach) initiative • The Golden Horseshoe Business Challenge • Wired Scholarship Program 	<ul style="list-style-type: none"> • Support for CEO development and training toward tech commercialization • Networking & education for early stage company founders/CEOs • Promotion and acceleration of scalable businesses in region • Training and assistance to improve regional pursuit of \$ awards • Stimulate the formation of new companies and regional profile • Skill upgrade training for employed workers in each WIB area
4. Facilitate development of technical competencies, market intelligence & networking.	<ul style="list-style-type: none"> • Masters of Science in Science and Technology Commercialization • Technology & Innovation Commercialization initiative • The Golden Horseshoe Business Challenge • Cluster Networks • The Entrepreneurs Network • Entrepreneurship & Strategic Growth Immersion Sequence program 	<ul style="list-style-type: none"> • Masters in Commercialization of Technology: identifying commercial potential of IP. • Support for CEO development and training toward tech commercialization and advancement • Stimulate new company formation, regional networking • Industry and cross industry networking idea exchange • Networking & education for early stage company Founders/CEOs • Promotion and acceleration of scalable businesses in region

CGR Recommendation	Finger Lakes Wired Activity	Description
5. Adopt competency management as the platform for workforce strategy.	<ul style="list-style-type: none"> • Wired Scholarship Project • Regional Apprentice System 	<ul style="list-style-type: none"> • Skill upgrade training for employed workers in each WIB area • System to link classroom/lab instruction to on-the-job training
6. Develop a database of critical resource providers and supporting information.	<ul style="list-style-type: none"> • Wired Asset Map and Gap Analysis 	<ul style="list-style-type: none"> • Inventory of regional assets • Creation of matrix of available resources, overlaps and gaps
7. Continue to enhance ongoing opportunities for the dissemination of key knowledge.	<ul style="list-style-type: none"> • Asset Map and Gap Analysis Results • Phase O SBIR/STTR grant writing assistance 	<ul style="list-style-type: none"> • Inventory of regional assets • Creation of matrix of available resources, overlaps and gaps • Grant writing assistance in pursuit of \$ awards from Govt.
8. Establish a vehicle to provide companies with access to competitive intelligence on markets, customers, and competitors.	<ul style="list-style-type: none"> • RIT Knowledge ClearingHouse funded by New York State 	<ul style="list-style-type: none"> • Process for regional businesses for information sharing and accessing resources
9. Work with Rochester Area Colleges to provide a coordinated regional response to sector workforce needs.	<ul style="list-style-type: none"> • Wired Asset Map • Rochester Area Colleges initiative Biz2Edu website 	<ul style="list-style-type: none"> • Inventory of regional assets • Share information from web access to resources at 19 colleges & universities
10. Focus attention on the dissemination of knowledge from universities to the marketplace.	<ul style="list-style-type: none"> • The Entrepreneurs Network • MS in Science and Technology Commercialization • Pre-Seed & New Product Workshop • Technology & Innovation Commercialization initiative 	<ul style="list-style-type: none"> • Networking & education for early stage company founders/CEOs • Masters in Commercialization of Technology: identifying commercial potential of IP. • Addresses gap in the commercialization continuum at “pre-seed” stage and will improve the identification and qualify technologies for transfer. • Support for CEO development and training toward tech commercialization and advancement
11. Establish a vehicle for two-way communication between training providers and business firms supporting immediate training needs.	<ul style="list-style-type: none"> • WIBs • Wired Scholarship Project • Rochester Area Colleges initiative Biz2Edu website 	<ul style="list-style-type: none"> • Workforce Investment Board interaction with trainers and businesses • Skill upgrade training for employed workers • Share information from web access to resources at 19 colleges & universities