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# **Workforce Analysis of the Optics & Imaging Cluster in the Finger Lakes Economic Development District**



**GENESEE/FINGER LAKES**  
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## Mission Statement

*The Genesee/Finger Lakes Regional Planning Council (G/FLRPC) will identify, define, and inform its member counties of issues and opportunities critical to the physical, economic, and social health of the region. G/FLRPC provides forums for discussion, debate, and consensus building, and develops and implements a focused action plan with clearly defined outcomes, which include programs, personnel, and funding.*



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### Introduction

Industry clusters are generally defined as interrelated industries and firms that have similar operational, technical, labor, and other resource needs and produce goods or services that may compete with or have strong alliances to each other and are concentrated geographically. Empire State Development Corporation (ESD), New York State's economic development agency, has used a cluster strategy to focus efforts on firms that interact with each other based on buyer-supplier relationships, shared technology, perceived membership in a common set of industries, and/or (as in this case) a common workforce in the State's economic development districts (EDDs). The clusters identified throughout New York State are "basic" or "traded"; that is these groups of industries as a whole export goods and services bringing out-of-area spending to an EDD.

Through a grant from the US Economic Development Administration, ESD and their consultant Regional Technology Strategies, Inc. (RTS) collaborated with the New York State Association of Regional Councils (NYSARC) to administer a survey requesting information on workforce development trends, issues, and priorities in the primary clusters of the State's EDDs. For the Genesee/Finger Lakes Region, the optics and imaging cluster was chosen given the high location quotient (LQ)<sup>1</sup> of firms engaged in these industries in the EDD.

The following analysis includes a brief discussion of the survey methodology used to gather information on the cluster's workforce, the results of the returned surveys, and significant trends or priorities identified through the survey responses. For a full report on workforce and training trends (including the survey responses and further quantitative and qualitative analysis) in the optics and imaging cluster in the Finger Lakes EDD and other clusters throughout New York State refer to RTS's *Building Skilled Workforces for New York's Regional Economies*.

### Methodology

The Genesee/Finger Lakes Regional Planning Council (G/FLRPC) sent a three-page survey containing fourteen questions on employment and training to firms in the optics and imaging cluster as identified by ESD and received 21 completed surveys. The individual industries that make up the optics and imaging cluster are presented along with their corresponding Standard Industrial Classification (SIC) code in Table 1.

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<sup>1</sup> Location quotients are coefficients used to determine the amount of representation a particular industry or set of industries has in a region. Essentially, location quotients are the ratio of a variable (usually jobs) in an industry against the total number of the variable in an area compared to ratio of the same variable for a reference area (usually the nation or a state). A location quotient above one (1) represents a higher representation of a particular industry or set of industries in the region compared to the reference area.

The survey's questions included the establishment's number of employees, educational attainment of the workforce, shortage of employees by type of skills, percent of employees hired locally and from other labor markets, workforce skill levels, future skills requirements, and training expenditures, sources, and willingness to invest in training. A copy of the ESD-NYSARC survey is provided in its entirety in Appendix A at the conclusion of this report.

Table 1

<b>Industries Included in the Optics &amp; Imaging Cluster in the Finger Lakes EDD</b>	
<i>SIC Code</i>	<i>Industry Description</i>
357	Computer and Office Equipment
366	Communications Equipment
367	Electronic Components and Accessories
3695	Magnetic and Optical Recording Media
381	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical Systems, Instruments, and Equipment
3825	Instruments for Measuring and Testing Electricity and Electrical Signals
3827	Optical Instruments and Lenses
385	Ophthalmic Goods
386	Photographic Equipment and Supplies

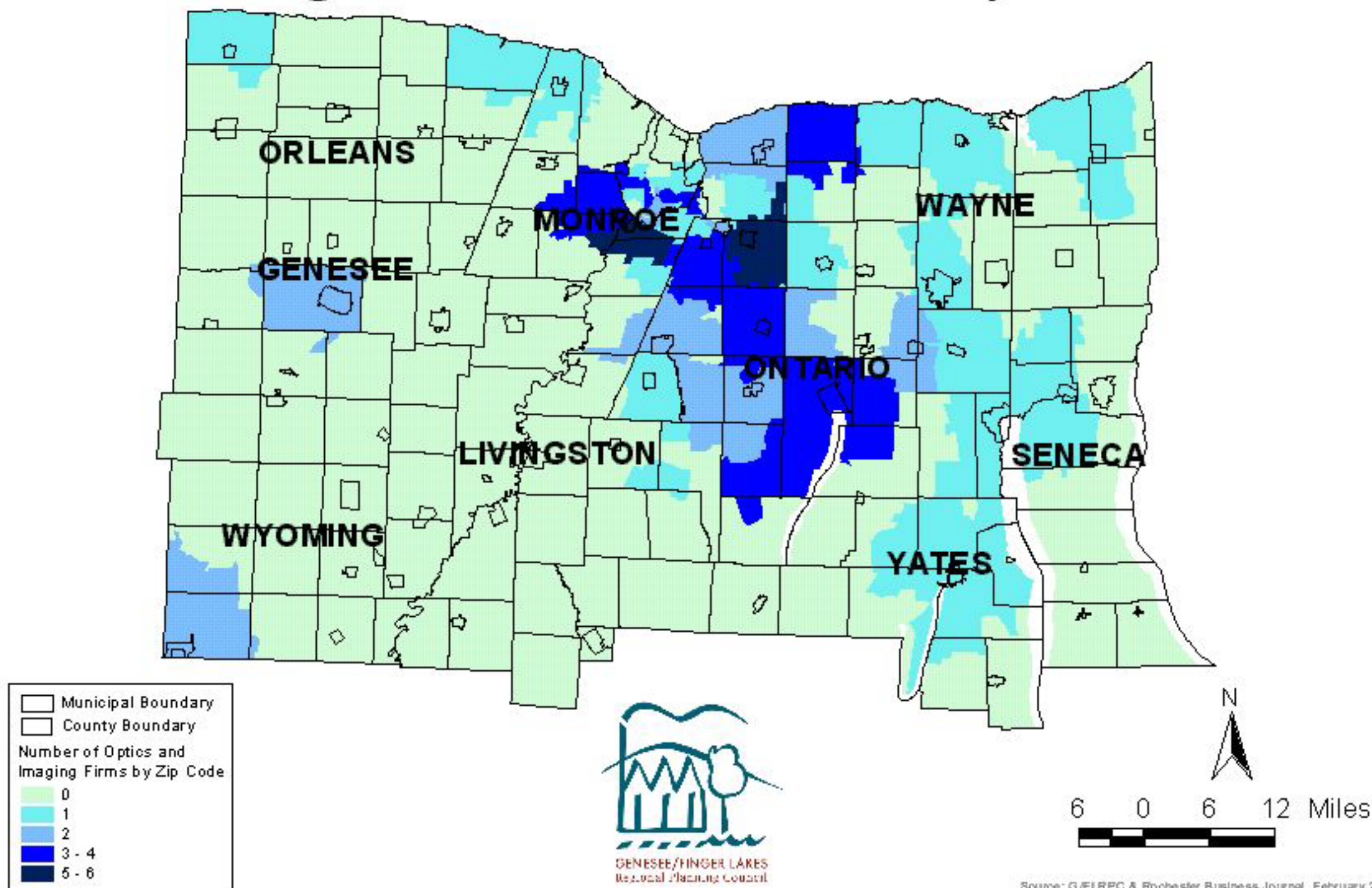
Source: Empire State Development, 1996.

The returned surveys were then recorded and tabulated in total as well as by number of employees to gain insights into the associations between the size of the establishment and current and future workforce needs, willingness to invest in training, and familiarity with training providers.

It should be noted that all but two (90%) of the responses were from optics and imaging firms located in Monroe County. Based on the G/FLRPC/Rochester Business Journal's *Rochester-Finger Lakes Region 1999 Directory of Manufacturers*, there were 85 establishments in the nine-county EDD (Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, Wyoming, and Yates) having SIC codes matching those in Table 1. Of those eighty-five establishments, sixty percent (52 firms) were located in Monroe County. The only other county with more than ten optics and imaging firms was Ontario County with 15 (18%). Map 1 on the following page, presents the number of optics and imaging firms by zip code in the Genesee/Finger Lakes Region (EDD).

Map 1

# Optics and Imaging Firms by Zip Code in the Finger Lakes EDD - February 2000



While the optics and imaging cluster is heavily concentrated within Monroe County, the lack of responses from firms in the other counties of the EDD should be taken into account. The skills required by establishments in the optics and imaging cluster will be industry-specific with minor variances due to firm-specific procedures, production processes, and cultures. However, the ability to attract employees from the local or regional labor market and training expenses and providers may differ significantly due to location and this will be understated based on the available data.

### Analysis

Two-thirds of the establishments returning surveys (14 firms) have between 10 and 150 employees with an equal number (seven) of firms with 10 to 50 employees and 51 to 150 employees. Only two respondents employ less than 10 persons and the same was true for those with over 250 employees. The remaining three survey respondents employ between 151 and 250 workers. For the purposes of this analysis the firms are categorized as follows:

- ❑ Less than 10 employees – Small
- ❑ Between 10 and 50 employees – Small-to-Medium
- ❑ Between 51 and 150 employees – Medium
- ❑ Between 151 employees and 250 employees – Medium-to-Large
- ❑ Over 250 employees - Large

Just over half of the workers employed by the survey respondents have only a high school degree and nearly 30% have a bachelor's degree (BA or BS) or higher. However, in the small and small-to-medium size firms over half of all employees have completed some college level work. The two small establishments that responded reported that 55% of their workforce has an associate's degree or higher: the highest percentage of any size category. Conversely, over 75% of employees in the medium size firms have only a high school diploma.

When questioned on difficulty in finding employees with certain skills levels, the answers varied according to establishment size. Firms were asked to assign a score between one (very low) and five (very high) to the degree that shortages in 1.) basic skills, 2.) information technology (IT) skills, 3.) non-IT production skills, and 4.) the availability of scientists, engineers, and managers limited their business success. Across all four categories, the two small firms reported the lowest degree of difficulty in finding employees with the necessary skills (1.85). The medium-to-large firms expressed the greatest difficulty with an average of 3.5 mainly due to a 4.7 score in recruiting and hiring scientists, engineers, and managers.

The vast majority of workers employed in the EDD's optics and imaging cluster are from the local labor market. Across all firms in the cluster, 99.5% of low-skilled employees, 97.8% of medium-skilled employees, and 84% of high-skilled employees were hired from within the local labor market. The majority of those hired from outside the local

labor market were residing in New York State at the time of their appointments. Examples given on the survey for each skill level were as follows:

- ❑ Low-skilled – machine operators, desk clerks
- ❑ Medium-skilled – machinists, technicians, computer operators
- ❑ High-skilled – engineers, programmers, managers

The cluster's firms were then asked to rate the current skill levels of all non-administrative workers as well as the firm's future skill requirements in five areas. The available ratings to be assigned were very low, low, average, high, and very high. The five areas of skills to be rated included:

1. Management skills
2. "Soft" job skills<sup>2</sup>
3. Computer/IT skills
4. Other technical skills<sup>3</sup>
5. Basic literacy

In each of the five areas the current skills were rated as average or greater (high and very high) by at least three-quarters of the firms. In "other technical skills" and "basic literacy", 95% of the firms that responded rated their non-administrative workforce as average or above. In these same two skill areas, none of the 21 respondents rated their employees' skills as very low and there was only one low response in these skill areas. Current IT skills among the EDD's optics and imaging workforce received the lowest ratings with almost one-quarter of the respondents rating their workforces as low or very low. Among all firms responding, "management skills" and "soft" job skills received the largest percentage (61.9%) of average rankings across the five skill areas.

According to the survey responses, firms of all sizes expect that the future skill requirements of their workforces will exceed their present standards. When queried regarding future requirements in the skills areas, IT skills, "other technical skills", and "basic literacy" were anticipated as having to be average or higher by all of the firms. Two-thirds of the firms responding estimated the "other technical skills" of their workforce as being high or very high in the future with over half (nearly one-quarter overall) of these respondents estimating their workforce's "other technical skills" would be very high in the future. Two-thirds of all the respondents also estimated their workforce's future "soft" job skills would be high or very high. Overall, at least 91% of the respondents estimated their future workforce would require average or higher skills in all five areas. The percent per response by skill area is presented on the following page in Chart 1.

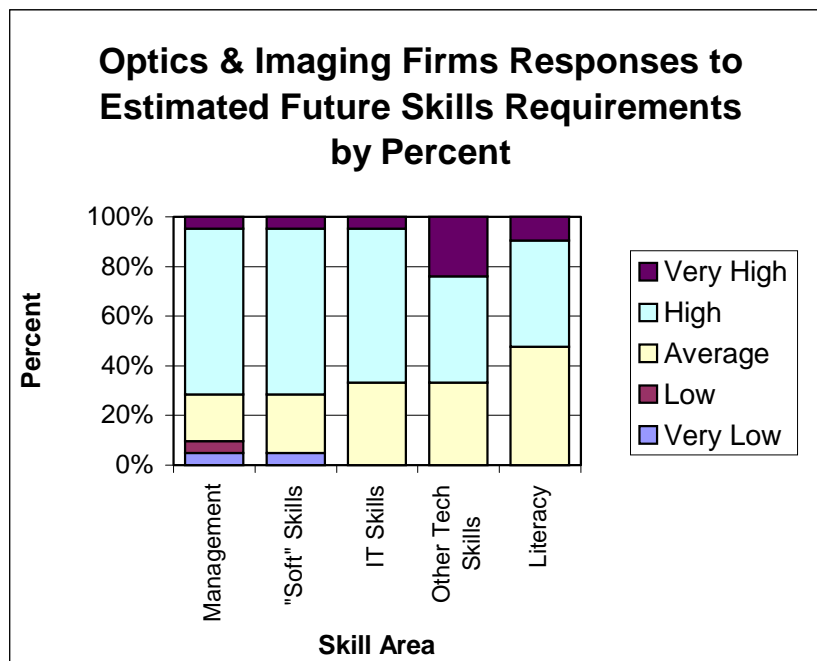
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<sup>2</sup> The survey listed communications, teamwork, and problem solving as examples of soft skills.

<sup>3</sup> The survey defined other technical skills as the "ability to use or quickly learn office or production equipment, processes, and procedures."



Chart 1



Firms were also asked to provide information on where employees received training in the five skill areas. In all skill areas other than literacy, the individual firm did much of the training either in-house or contracted with a private training firm. On average, just over one-third of management skills training was done in-house with almost another one-third provided by private firms. Firms provided almost half of training in "soft" job skills in-house with private training providers accounting for 30% on average across all respondents regardless of the size of the company. As with management and "soft" job skills, employees training in IT skills was done mostly in-house (40%) with training by private firms accounting for an additional 30%. Other technical skills had the highest percentage of training provided in-house at 63% with the largest percentage of training by equipment vendors (7%) occurring in this skill area. Respondents relied primarily on high schools, themselves, and training providers classified as "other" for employees' literacy skills.

When analyzed by size of the firm responding, large firms tended to provide the most in-house training across the four skill areas not including literacy skills. Small-to-medium size firms used community colleges more than any other employment size class and the same was true of medium-size firms utilizing private training firms. On the following page, Charts 2 through 5 present the percentage of training by provider for management skills, "soft" job skills, IT skills, and other technical skills for all firms responding to the survey.



Chart 2

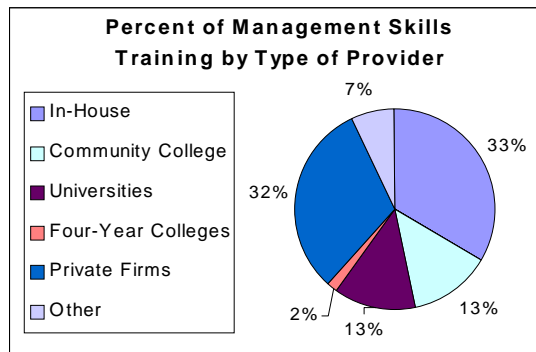


Chart 3

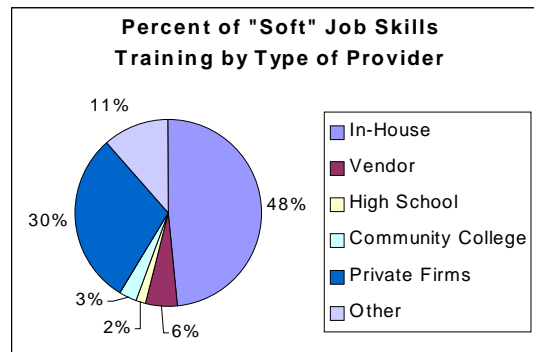


Chart 4

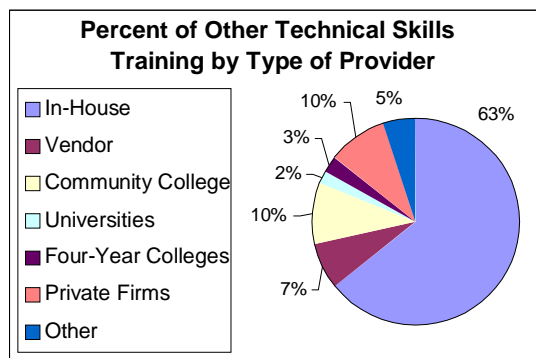
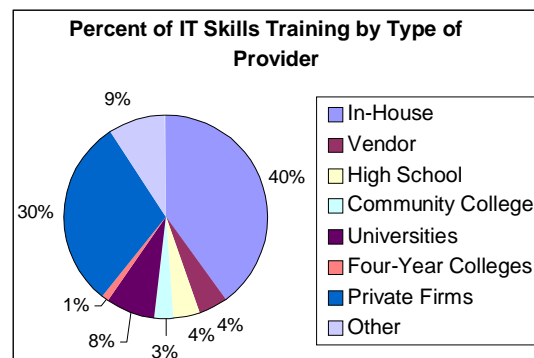


Chart 5



The survey also requested information on annual training expenditures per non-administrative employee. Nearly half of the respondents reported that they spent between \$100 and \$500 per employee during the most recent full year. Six companies (29%) had training expenditures between \$501 and \$1,000 per employee over the same time period. Only one respondent reported spending over \$1,000 per employee for training and it was a large firm with over 250 employees. The remaining four firms (19%) spent less than \$100 per employee including both of the firms within the small category (less than 10 employees).

When asked how much they would spend on training over the next five years none of the respondents said that their expenditures would be less while nearly 40% indicated that they would spend somewhat more. One-third responded that they would spend the same and the remaining 29% (six firms) anticipated spending a lot more on training over the next five years. For the two firm sizes with the most responses (small-to-medium and medium: seven each) the responses were identical. In each of these two size classifications, three firms (42.9%) responded that they would spend the same amount for training, two (28.6%) would spend a lot more, and the remaining two (28.6%) would spend approximately the same amount in the next five years.

In addition, the survey requested that firms rate their willingness to invest in training in the five skill areas with choices ranging from very low to very high. Over half of all firms indicated that their willingness to invest in training was high or very high in the areas of management skills, IT skills, and other technical skills. Just under half of the respondents had a high or very high willingness to invest in "soft" job skills. Only one-

quarter of the firms returning the survey had a high willingness to invest in the literacy skills of their employees. Literacy was the only skill area with no respondent to rate a very high willingness to invest in. The majority of responses in the five skill areas were rated either average or high:

- ❑ Management skills: 66.7% rated average or high
- ❑ “Soft” job skills: 71.4% rated average or high
- ❑ IT skills: 71.5% rated average or high
- ❑ Other technical skills: 61.9% rated average or high
- ❑ Literacy: 60% rated average or high

Based on the employment class size of firms, small-to-medium firms rated their willingness to invest as the highest across all employment class sizes. Eighty-six percent of small-to-medium size firms rated their willingness to invest in “soft” job skills as high or very high. This was 38 percentage points higher than the average for all firms that responded to the survey. In fact, small-to-medium size firms’ willingness to invest in all five skill areas was greater than that of any other employment size class as measured by percent rating their willingness as high or very high.

Firms were asked to rate nine training providers in the categories of familiarity with the organization/institution, the quality and value of training provided, and the expertise of the particular organization/institution in the optics and imaging industry. Universities and four-year colleges received the highest ratings in all three categories tying with community colleges in quality and value. Community colleges received the second highest ratings for familiarity and third highest for expertise in the optics and imaging industry. Equipment vendors and consultants received the next highest ratings in familiarity with vendors perceived as having better quality and value in addition to greater expertise in the industry.

Among the remaining training organizations and institutions, private firms and high schools and their associated BOCES programs had similar ratings in the familiarity and value categories with private firms viewed as having a greater level of expertise. Trade associations had slightly less than average rating across all three categories. Private Industry Councils/Workforce Investment Boards (PIC/WIB) and ESD had the lowest familiarity among all firms in the optics and imaging cluster based on the survey responses.

Based on the survey responses, familiarity with training institutions and organizations was closely associated with the size of the firm. Large and medium size firms had the highest average ranking of familiarity across all of the training organizations and institutions followed by medium-to-large firms. The large and medium size firms also had the largest dollar expenditures for training per non-administrative employee by employment class size, and this may signal that greater spending on training is directly related to greater analysis of return on training expenditures. Also of note is that familiarity with the PIC/WIBs and ESD was greatest in the large firms.

### Findings

Based on the rating scale used to measure difficulty in finding employees in certain occupational areas (one being very low and five being very high), optics and imaging firms in the Finger Lakes EDD have a less than average difficulty in finding employees with basic skills and IT skills. There is greater difficulty in finding employees with non-IT production skills (machinists and electricians) and scientists, engineers, and managers. Still, the average ranking in these two occupational areas across all firms responding to the survey was slightly above average (2.6).

Given the high percentage of workers hired from the local labor market across all skill levels, local workforce development activities appear to be meeting firms' minimum needs as indicated by difficulty levels in finding employees across all skill levels. However, the survey responses indicate that future skill requirements will increase over the next five years. Familiarity with and perceived quality of training provided (as determined by the survey) will have to increase particularly in non-academic institutions and organizations. Industry expertise will also require upgrades across all training providers.

The purpose of cluster-based economic development is to provide an economy of scale in resource investment. Currently, firms themselves provide the largest share of training in the four skill areas not including literacy among all training providers. Firms provide training specific to their individual operations, processes, and production methods. Cluster specific or even multi-industry specific training would provide better benefits at similar or lower costs. Optics and imaging firms in the Finger lakes EDD have indicated that they expect to spend more on training in the coming years and have expressed a willingness to invest in skill areas that could have training programs tailored to the needs of several industries in conjunction. Additionally, there is an interest in exploring "regional skills alliances" that include groups of employers, educational institutions, and other training providers (both public and private) similar to those in other parts of the nation.

There are currently 13 Centers for Advanced Technology (CAT) across New York State that provide benefits and support through research and training programs. As opposed to financial assistance, these CATs furnish technical assistance that provides greater accessibility for firms of all employment class sizes and could serve as a forum for networking and joint ventures among groups of businesses and academia. In the Finger Lakes EDD, the University of Rochester and Rochester Institute of Technology serve as the CAT for electronic imaging. Another factor is the development of Workforce Investment Boards that include greater involvement from the private sector and are replacing the Private Industry Councils.

Overall, new avenues for increased training opportunities and better return on investment for workforce development activities are needed for the optics and imaging cluster in the Finger Lakes EDD. ESD and the G/FLRPC can and should continue to work with county and local economic development and workforce development departments and industrial development agencies to create a more qualified pool of available labor in the optics and imaging cluster.

**Appendix A**  
**Empire State Development Corp./NYSARC Survey**

## New York Survey of Employers: Employment and Workforce Development

This is a short survey about employment and training needs and practices of industry. Its purpose is to help New York Empire State Development Corporation identify and support new strategies that will better foster the growth and competitiveness of your industry. The information gathered will not be attributed to individual firms.

1. In what county are you located? \_\_\_\_\_
2. How many people do you employ?  
 \_\_\_\_\_ <10      \_\_\_\_\_ 11-50      \_\_\_\_\_ 51-150      \_\_\_\_\_ 151-250      \_\_\_\_\_ >250
3. What is your major product(s) or type of business?
4. About what proportion of your work force has the following levels of educational attainment:  
 \_\_\_\_\_ High school  
 \_\_\_\_\_ Some college but no degree  
 \_\_\_\_\_ Associate degree  
 \_\_\_\_\_ BS/BA or higher  
**100% Total**
5. Many companies in New York State are experiencing difficulty finding employees in certain occupational areas. On a scale of 1 = very low to 5 = very high (0 = do not employ), to what degree do shortages in the following areas limit your business success?  
 Shortages of employees with basic skills \_\_\_\_\_  
 ...of employees with Information Technology (IT) skills \_\_\_\_\_  
 ...of employees with non-IT production skills (e.g., machinists, electricians) \_\_\_\_\_  
 ... of scientists, engineers, or managers \_\_\_\_\_

6. About what *percentage* (in recent years) do you hire from:

	Local labor market	In-state, non-local	Out of state	Total
Low-skilled				100%
Mid-skilled				100%
High-skilled				100%

Low-skilled (e.g., machine operators, desk clerks)

Mid-skilled (e.g., machinists, technicians, computer operators)

High-skilled (e.g., engineers, programmers, managers)

7. How would you rate your current skill levels of all non-administrative workers in each of the following areas? (Check appropriate boxes.)

Skills	Very Low	Low	Average	High	Very High
Management skills					
"Soft" job skills*					
Computer/IT skills					
Other technical skills**					
Basic literacy***					

\* Communications, teamwork, problem solving, etc.

\*\* Ability to use or quickly learn office or production equipment, processes, and procedures.

\*\*\* Literacy, numeracy, English as a second language

8. How would you estimate your company's future skill requirements (next five years) in (check appropriate boxes):

Skills	Very Low	Low	Average	High	Very High
Management skills					
"Soft" job skills*					
Computer/IT skills					
Other technical skills**					
Basic literacy***					

\* Communications, teamwork, problem solving, etc.

\*\* Ability to use or quickly learn office or production equipment, processes, and procedures.

\*\*\* Literacy, numeracy, English as a second language

9. How much money would you estimate your company spends annually (most recent full year) on training per non-administrative employee?

\_\_\_ <\$100      \_\_\_ \$100-500      \_\_\_ \$501-1,000      \_\_\_ >\$1,000

10. Over the next five years, will you spend on training

\_\_\_ less      \_\_\_ about the same      \_\_\_ somewhat more      \_\_\_ a lot more

11. Who do you use for training? Specifically, what approximate *percentage* of the following types of education or training provided to your current employees is provided by each of the following sources?

Skills	In-house	Equip. Vendor	High School	Comm. College	Universities	4-year colleges	Private Firms	Other	TOTAL
Management skills									100%
"Soft" job skills*									100%
Computer/IT skills									100%
Other technical skills**									100%
Basic literacy***									100%

\* Communications, teamwork, problem solving, etc.

\*\* Ability to use or quickly learn office or production equipment, processes, and procedures.

\*\*\* Literacy, numeracy, English as a second language

12. How willing are you to invest in education or training for your work force in (check appropriate boxes):

Skills	Very Low	Low	Average	High	Very High
Management skills					
"Soft" job skills*					
Computer/IT skills					
Other technical skills**					
Basic literacy***					

\* Communications, teamwork, problem solving, etc.

\*\* Ability to use or quickly learn office or production equipment, processes, and procedures.

\*\*\* Literacy, numeracy, English as a second language

13. For the following sources of (or funding for) education and training, please rate (1) your familiarity with it, (2) your assessment of its quality and value to you, and (3) its level of understanding of and expertise in your industry. Please use a range of 1 to 54 for each, with 1 being very low and 5 being very high. Please use 0 if the source is unavailable in your area.

Source	Your familiarity	Quality and value	Special industry expertise
Universities & four year colleges			
Community colleges			
High school & BOCES			
Private companies			
Equipment vendors			
Trade associations			
Consultants			
Private Industry Council			
Empire State Development Corp.			

14. In some parts of the country, groups of employers in similar or complementary businesses have joined with education and training institutions to form "regional skills alliance" that cooperate in and jointly finance worker training. How willing are you to explore similar arrangements?

\_\_\_ Very Low      \_\_\_ Low      \_\_\_ Average      \_\_\_ High      \_\_\_ Very High