

Selected excerpts from

***IT Skills: A Survey of the Use of Information Technology
in the Northeast Kingdom***

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The Northeast Kingdom Workforce Investment Board

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EXECUTIVE SUMMARY

The IT Skills Survey was commissioned by the Northeast Kingdom Workforce Investment Board (NEKWIB) to learn how businesses in Caledonia, Essex and Orleans counties use information technology (IT) in their businesses and what employee skills businesses need to use this technology. One of the primary uses of the information collected will be for the design of training programs to help ensure that the Northeast Kingdom workforce has the skills required for current and future business needs. The focus of the survey was to determine the number of employees using computers, the most common software products used, the workforce skills required, and the strategies employed by businesses for IT training. Information was also collected regarding hardware and local area/wide area network usage, and IT services outsourced, primarily from a skill requirement perspective. The survey was not limited to employees whose job function was 100% IT specific, such as employees of an IT department or those who work within an IT services business. Information was collected for all employees that used a computer and required some level of computer skills to perform one or more aspects of their job responsibilities.

Data for the IT Survey was collected through a combination of in-person interviews and a mail survey. Information was gathered from a total of 71 businesses, including 23 in-person interviews and 48 responses to the 214 mail surveys distributed. The surveyed businesses represent 4,870 of the estimated 26,200, or about 19%, of the workers employed in the Northeast Kingdom¹. While some IT skills surveys have been restricted to those industries with a traditionally high penetration of technology, this survey attempted to reach a broad spectrum of

¹ Vermont Department of Employment and Training [Labor Market Bulletin](#), Fourth Quarter 2001, estimates for April 2002 workforce in the Newport and St. Johnsbury labor markets. These labor markets cover most, but not quite all, of Caledonia, Essex and Orleans counties.

NEK businesses. The 14 industries represented by the respondents employ 85% of the NEK workforce. For most industries, the survey pool included several businesses of varying size and location. An attempt was made to reach every business in the NEK which specifically provides IT services to the public or to other businesses. A word of caution: Be careful when drawing conclusions from this report because some industries are more heavily represented than others, and some single unusual responses can significantly skew averages, especially industry averages.

The use of computers within NEK businesses is extensive with about 45% of the employees in the surveyed businesses using a computer to perform their job. Although there are a handful of small businesses, which specialize in IT services, and a handful of large businesses with dedicated IT personnel, the vast majority of IT-using employees have other non-IT responsibilities as their primary job. This is true not only for the positions which require IT skills in order to perform their job responsibilities, but also for many of the people who have technical responsibility for the computer hardware and software used by their businesses. It is estimated that at least 90% of the businesses surveyed have one or more employees who provide IT technical support in addition to their other job responsibilities.

There are several areas in which the general workforce is lacking the level of IT skills desired by businesses, in both the basic general IT skills area and in more advanced technology subjects. To compensate, employers must do extensive on the job training, which can lower productivity. There is also not a substantial quantity of advanced IT capabilities that are either deployed today or planned for the next five years. This could limit the competitiveness of a business in terms of its cost of doing business, reaching new customers and its ability to introduce new products and services.

Local educational institutions and IT service providers currently provide some IT training for the workforce, but this training received mixed levels of satisfaction. Very little advanced IT classroom education is available within the NEK, so most employees requiring advanced skills go out of the area or do without formal education. The demand for advanced IT education is generally too small for any one business to import it for its staff alone. Therefore, obtaining this education locally needs to be obtained through other means, such as Distance Learning, or coordinated by a third party, such as the WIB, to be used by multiple businesses.

Although this study was commissioned to study the IT skills needs of the current employers in the NEK, there are many opportunities to provide training for IT skills that would facilitate new economic development in the region. Proactively pursuing new IT businesses to locate within the NEK coupled with aggressive IT training programs could help provide a new base of businesses for the local economy.

BACKGROUND

In the fall of 2001, the Northeast Kingdom Workforce Investment Board completed a study of the workforce skill requirements of several key industries in the Northeast Kingdom. This study concluded that many NEK industries will require further use of IT applications and as a result “the IT sector will grow rapidly.” Because the study was general in nature, it was difficult to determine precisely what portion of the region’s workforce was engaged in IT activity. Consequently, a follow-up study was commissioned to further study the IT skills requirements of the NEK workforce. This secondary study, IT Skills: A Survey of the Use of Information Technology in the Northeast Kingdom, focuses on the IT skills required by a broad range of businesses in the NEK, including both the IT sector and other industries.

Selected Survey Categories

IT Job Responsibilities

Data collected includes the number and salary range of employees within pre-defined categories describing related types of IT tasks, industry certification preference, and the number of employees projected over the next five years within these skill areas. Instructions were provided to either record an employee in only one category or use fractions if someone spent a significant amount of time performing tasks in more than one category.

The categories describing similar types of IT work performed were pre-defined as follows. Some of these categories are not what would be defined for jobs within the IT industry itself, but rather the kinds of IT tasks that were performed within the NEK businesses surveyed.

| | |
|--------------------------------|--|
| General Computer Usage | Move between forms and files, entering, retrieving and saving data, elementary word processing, basic use of an industry-specific application |
| Standard Office Software Usage | Create and manipulate original work with word processing software, spreadsheets, simple databases |
| Packaged Software Usage | Use software products to create original material such as web pages, digital media, graphics, CAD, desktop publishing, spreadsheet programming, specialized reports, etc. |
| Computer Operations | Mainframe operation, job scheduling, execution and monitoring, data backup |
| Technical Support | Computer hardware/software installation, maintenance and problem determination, deliver training. Systems management, performance, capacity planning, security software administration and maintenance |
| Networking Support | Network hardware/software maintenance, administration, management and problem determination |
| Software Programming | Use programming languages to create, modify and maintain application and system software, and web sites |
| Software Development | Use advanced programming and knowledge of hardware/software architecture to design and build software applications or systems. |

IT Skills Required

To obtain more details about IT skill requirements, information was requested regarding the number of employees who need to be proficient in specific IT skills, skill areas for which it is difficult to find qualified individuals, and skill areas which require the use of outside services. The list of specific skill areas surveyed are:

- Basic Computer Competencies
- Word processing
- Spreadsheets
- Desktop Publishing
- Computer Graphics
- Computer Aided Design
- Presentation Software
- Web Site Design
- Web Site Development
- e-Commerce Applications
- Hardware Installation & Maintenance
- Software Installation & Maintenance
- Network Management
- Network Administration
- Network Problem Determination
- Security Software
- Database Creation
- Specialized Computer Operation
- Software Programming
- Accounting Software

IT Training

- Training sources utilized currently and expected to be used in the next 5 years including formal in-house training, on the job training, self-study, outside training programs and seminars.
- Average yearly expenditure for IT training now and in the next 5 years.

Services Outsourced

- The amount spent to purchase outside (outsourced) IT services and how much of these services are purchased from businesses located within the NEK.
- Changes expected to purchases of outside IT services over the next 5 years

SELECTED SURVEY RESULTS

The information collected through in-person interviews and mail surveys has been grouped into four main categories for reporting purposes.

| | |
|----------------|--|
| IT Environment | General information about IT environments and the software applications used, and some high level data on telecommunication and web site usage |
| IT Jobs Skills | IT job functions performed plus the specific IT skills which are needed today and in the next 5 years |
| Training | Current training practices and expenditures along with anticipated budgets for future training |
| Outsourcing | Sources and expenditures for outside IT services and the use of IT service providers within the Northeast Kingdom |

The following sections include detailed findings from the survey data and may also contain some additional observations. Not all observations are based on specific answers to survey questions but rather on conclusions drawn from the data and from other comments collected during the course of the survey. Some of these observations may require additional research to fully validate.

IT Environment

Summary

Computer applications are used within a vast range of NEK industries; however, in some industries, such as agriculture, the use of computers varies greatly from little or no usage at all to the use of sophisticated state-of-the-art applications. In other industries, such as banking and graphic design, the use of computer applications is absolutely essential to the operation of the business, to the extent that products and services cannot be delivered without the use of a computer. A fair amount of computing has found its way into traditionally labor-intensive industries, such as manufacturing, and some of these computer applications utilize very specialized equipment.

Few NEK businesses either create or modify computer applications but rather use generally available software tools such as Microsoft Office or industry specific applications. Businesses may do some customization to industry applications, but mostly they rely on software vendors to supply the applications, updates, maintenance and technical support. Also, a few businesses use applications that are provided and supported from other locations within their corporations, so little or no local support is required.

Selected Details

... In most industries, advanced IT skills are not required by most computer users, so the vast majority of the users identified in the survey would not be considered computer professionals. However, some level of IT skills are required by somewhere between 40% and 60% of the regional workforce.

The number of full and part time employees was collected for each industry sector surveyed. ... In some business sectors a very large percentage of the workforce use a computer. For example, 100% of the workforce in IT service provider sector, 99% in the financial and 83% in the media/graphics sectors use a computer. In other industries the percentage is quite low.

...

By far the most common computers used within the northeast kingdom are IBM-compatible PCs. Few businesses have migrated to Windows XP and during interviews few mentioned that they were planning to use Windows XP in the near future. People in the media/graphics industry use Macintosh computers and there is a very limited use of them in some other industries. Ten businesses indicated that they use Macintosh computers but only one business used them exclusively.

Ten businesses reported the use of one or more mainframe computers. The most common mainframe computer system used is the IBM AS/400. Use of Sun and IBM UNIX-based systems, as well as UNISYS mainframes, were also noted. Some businesses utilize mainframe computers located out of the area at remote headquarter locations, but generally the local staffs have very limited responsibility for these systems. Seven businesses (about 10%) reported the use of Linux, whose usage has been growing rapidly industry wide. The interview process revealed some usage of specialized computer-based equipment. These included shop-floor numerically controlled (NC) equipment at manufacturers, computerized feed and milk monitors on farms, and global positioning system (GPS) equipment in the timber industry.

Computer networking is of growing importance amongst all types of businesses with 68% reporting the use of Local Area Networks (LANs) and 44% using Wide Area Networks (WANs). LANs are being increasingly used to connect the computer equipment within a location, and WANs to connect these locations to each other, remote headquarters, and/or business partners. Even the smallest businesses communicate via the internet for email and research, although this usage alone was not considered to be using a WAN. In several cases, the available communications bandwidth and communication costs were identified as a limitation for the local businesses. Twenty-five percent of the businesses said that currently available telecommunication facilities were inadequate. ...

Many local businesses have informational web sites, with an increasing number possessing or planning e-Commerce applications. The use of e-Commerce web sites was not limited to the larger businesses. One very small retail business has a successful e-Commerce site that accounts for about 5% of sales and generates business from several international locations from buyers interested in Vermont made products. Overall, 35% of the businesses indicated that they expected to have an e-Commerce site with the next 5 years. ...

Observations and Recommendations

- The number of employees in the Northeast Kingdom using computers is substantial. ... The applications and systems used are relatively homogeneous, and, while there are a variety of industry-specific applications in use, the majority of them can be mastered with only basic IT skills.
- The IT usage in the NEK is anticipated to continue to rise. The seasonal employer mentioned earlier predicts that in five years all their employees, including the 440 seasonal ones, will use computers in their work. One large NEK business recently implemented a new payroll system that requires every employee to access the Internet to enter their timesheets and to see their paycheck stubs.

IT Job Skills

Information about IT job skills was gathered so that it could be analyzed with respect to current and future training requirements. The information was collected from two perspectives to obtain data about the kind of job functions that use information technology and the specific IT skills needed by the workforce to perform these job functions.

Summary

There are few jobs within the Northeast Kingdom that fit into the job categories commonly used within the IT industry. Nearly all workers who perform some IT specific tasks have other non-IT duties as their primary job responsibility. In the few large companies which have dedicated IT staff and the businesses which provide IT services, most employees still perform multiple IT jobs.

Although there are many jobs that only require the use of information technology to perform one or more business functions, a significant number of jobs require an individual to have many different IT skills. These are employees who provide the support and maintenance for a business's IT infrastructure in addition to their other non-IT responsibilities. This is especially common in small to medium size businesses but also occurs in large businesses. For example, a job position which does not have an IT job classification, may require the use

of common office products and one or more industry specific products to perform the responsibilities of the job. However, this same person may also be the resident technical expert for these products and do most of the technical support functions for computer hardware, software and computer networking.

Salary range information was collected but compensation based upon the IT component of any job cannot really be determined except for positions with IT service providers and the few jobs within other businesses that have 100% IT specific job responsibilities. For example, survey data shows that jobs requiring the use of standard office software pay more positions at greater than \$15 per hour than in the lower pay categories. One reason for this is that many highly compensated professionals use standard office software as part of their job, although their primary value to the company is not their IT skills.

Requirements for specific IT skills were also collected in order to ascertain how many individuals needed a specific skill, and to better quantify the potential population for skill training programs today and in the future. ... Since a single individual typically requires multiple IT skills the total for all the skills required is far greater than the number of employees using computers. The skills most difficult to find included hardware and software installation and maintenance, and skills required to maintain and operate networks. Approximately 20% indicated that these skills were difficult to find and that about one-third of the skills in these categories needed to be more advanced than just having basic knowledge.

Selected Details

... Respondents were also asked to provide the number of employees that currently require a skill at a basic level or at a more advanced level, and the number of employees that will require the skill in 5 years. Approximately half of the survey respondents did not provide any information about the number of employees that will need IT skills in the next five years. ... They were also asked to indicate which skills were difficult to find and if an outside service was ever used to obtain a particular skill. Advanced skill levels were not pre-defined for any skill, but rather left for interpretation by the responder.

Every employee who is required to use a computer has at least general computer skills, which was defined to include the following for this survey:

General Computer Usage – *Move between forms and files, entering, retrieving and saving data, elementary word processing, basic use of an industry-specific application.*

... Beyond general computer usage requiring basic computer skills, seven other job categories were defined. Although each of these job categories encompasses positions that utilize many different computer products, the disciplines and skill levels required are roughly the same. Four categories were defined that described more technically intense IT activities and 3 that describe functions that utilize IT to perform one or more job functions. These 3 categories were defined as follows:

Standard Office Software Usage - *Create and manipulate original work with word processing software, spreadsheets, simple databases.*

Packaged Software Usage - *Use software products to create original material: web pages, digital media, graphic designs, CAD, desktop publishing, spreadsheet programming, specialized reports, etc.*

Computer Operations – *Mainframe operation, job scheduling, execution and monitoring, data backup.*

...

The IT job categories that generally require a more technical set of IT skills were defined as:

Technical Support - *Computer hardware/software installation, maintenance and problem determination, deliver training. Systems management, performance, capacity planning, security software administration and maintenance.*

Network Support - *Network hardware/software maintenance, administration, management and problem determination.*

Software Programming - *Use programming languages to create, modify and maintain application and system software, and web sites.*

Software Development - *Use advanced programming and knowledge of hardware/software architecture to design and build software applications or systems.*

IT functions which are more technical in nature require fewer people than those that use IT to perform one or more business functions. It is generally more difficult to find qualified individuals to fill these more technical positions and the positions also place a greater demand for more advanced knowledge. ... The need for [technical support] skills is expected to grow significantly over the next 5 years in the 75-100% range. ... The need for networking skills is expected to increase by 50% over the next 5 years. Technical support and networking skills were identified as being difficult to find by about 20% of the respondents. Many comments were made about how job candidates with the desired skills could not be found so people were hired and trained over time, mostly through on-the-job training. One owner of an IT business stated that, "Half the staff started at a basic level and we trained them."

Software Programming and Software Development categories had the fewest job positions identified Software programming requires skills in programming languages and tools. A software developer is also skilled in programming languages but must also be able to design the logic of what must be programmed. The need for advanced skills was the largest identified for any skill with 66% advanced skills needed for e-Commerce applications and 83% for software programming. As previously mentioned, the high level of advanced skills indicated may not really be a requirement. Software programming is an advanced IT skill but a basic knowledge of software programming may suffice.

Other IT skills required by 100 or more individuals includes Presentation Software, Web Site Design and Accounting Software. Accounting Software skills show little grow over the next 5 years but the other two are forecasted to grow significantly. ...

Observations and Recommendations

- Although some employers had difficulty finding qualified employees in every job classification, the more technical classifications are particularly difficult to find. Software programming and development are particularly difficult, although there is very limited software development in the NEK. Technical Support and Network Support personnel were often mentioned during the interview process as being in short supply.

- Salaries offered for the more technical IT job categories are quite a bit lower in the NEK than in Burlington and other metropolitan areas, but even the local salary rates are beyond the means of some smaller employers.
- NEK employers are forecasting significant growth in both the number of IT skilled employees and the level of their expertise. Some of the more basic skills will be provided by younger workers who will have some computer knowledge from their public education. It is unclear how the rest of the required skills will be obtained, as the forecasted training budgets are quite small.

Training

Selected Summary

Employers in the Northeast Kingdom utilize a number of strategies to enhance the IT skills of their workforce. More IT training is done onsite than offsite, with the most common in-house education strategy being On the Job Training (OJT). More employers reported using offsite classroom education than OJT, but anecdotal information indicates that both the frequency and cost of OJT is under-reported by the survey respondents. NEK businesses rely heavily on training resources from outside of the NEK for much of their formal training. ...

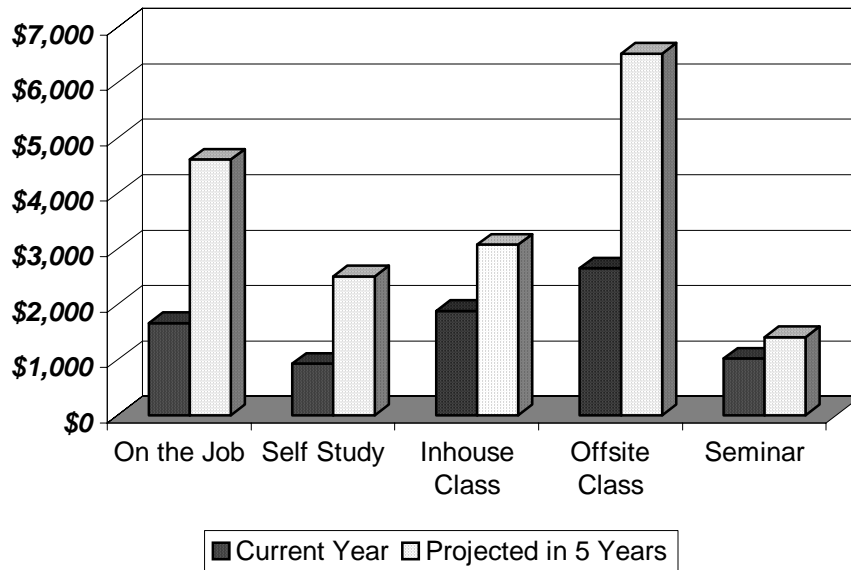
Computer curricula in the local schools have improved the basic IT skills of the younger work force, although there is still a requirement for better understanding of “how things work.” Within the more technical IT skills, network administration and hardware/software support skills are the ones which are reported to have the greatest short term and long term demand.

While this report was commissioned to study the IT skill requirements of the current businesses in the Northeast Kingdom, the local economy is definitely in transition, and any regional training plans will need to support the future business outlook. This is a golden opportunity for training and economic development resources to join together to nurture a work force for a new, clean IT industry in the region.

Selected Details

... OJT has a lot of hidden costs associated with it, including lowered productivity for the person doing the training and the trainee, and a longer than desired time period before the employee can be fully functional. And, since on the job training is typically focused on teaching only the basic skills required to start doing a job, employees often do not gain sufficient knowledge to take advantage of more advanced features that are available within the computer systems they are using. Apart from the one large OJT data point, the other employers who reported expenditures on OJT spend an average of \$101 for each of their IT users. ... During the interview process, OJT was frequently mentioned as the primary or only strategy for employee IT training, yet very few employers were able to articulate a cost estimate for this.

Average Annual IT Training Cost Per Business



Note: One report of \$250,000 for current year OTJ training has been removed from this sample

... New IT systems often drive training expenditures, and one business reported an anticipated \$75,000 expenditure for offsite training for a new application. If this expenditure were not included in the data, projected spending for offsite classes would only show a slight increase.

The forecast of IT skills needed in the next five years shows a very clear expectation that required workforce skill levels will need to be more advanced than they are presently. Trying to teach these advanced skills through OJT will probably not be feasible. A more significant investment in IT skills training will be necessary in order to have a workforce with advanced skills.

A few businesses mentioned using local training providers or IT service providers for onsite or offsite classroom training, with mixed results. The most positive comments were in regards to training programs that were attended by groups of employees from the same business with similar skill levels. These training classes were even more beneficial when the business worked with the trainer to develop the training topics. The businesses which had the best experience with offsite training generally used training services outside of the Northeast Kingdom, although there were also positive reports on local schools. Those who had negative experiences with NEK classroom training commented on inadequate equipment, inexperienced instructors and classrooms with widely ranging student experience levels. Students needing advanced IT training must go out of the area, as the courses offered at the local schools generally cover only basic IT subjects.

Most public schools in the Northeast Kingdom now offer computer training to the students. While computer application knowledge of the emerging workforce is improving, there is still a lack of understanding of the general concepts behind the common applications. Several

businesses reported that their employees have difficulties with file management, copy/paste, and other basic skills that are common to the effective use of a PC. A business owner in the Travel and Tourism industry noted, “While most of our staff can use basic software applications such as Word, they are lacking in a basic understanding of how computers work, file management, system backup, trouble shooting, file saving, program customization, etc.” Similar comments were heard from both business managers and IT support staff.

Observations and Recommendations

- Most of the businesses interviewed feel that the younger employees are coming to them with an adequate knowledge of basic computer applications, based on their exposure to computers in the local schools. However, older workers are generally less skilled in IT, and they are often less inclined to pursue obtaining the IT skills training they need. When they do, they are less likely to acquire IT skills beyond the minimum that their present job requires.
- Business owners could benefit from receiving training on how IT can help improve their business. Large corporations generally have a Chief Information Officer who is responsible for understanding new technology and its application to the business, preparing the ROI analysis for new IT investments, and overseeing the implementation of new computer systems. Most NEK businesses are too small to justify this position, and few of the business owners/managers have the background to perform this function themselves.
- Nationwide within the IT industry, training is an important area of outsourcing. This can range from customized, in-house formal classes, to general IT courses offered at local schools and colleges, to specialized highly technical classes delivered by professional IT training companies. Several IT service providers in the NEK offer training, as do many of the local schools and colleges, but many businesses are not aware of this training resource. Quite possibly this training is either offered on an ad hoc basis or training programs are not marketed effectively to local businesses.
- Another strategy for improving the quality of local classroom training would be to contract out-of-area IT trainers to teach classes in the NEK. Most businesses would not be able to fill a classroom with their own people, so these classes would need to be sponsored by a third party and populated by multiple businesses. In more urban areas, there are often computer user groups which sponsor free vendor-given seminars or fee-based training classes, but the NEK has few, if any, active user groups. Industry associations, chambers of commerce or the WIB might be possible alternate sponsors of this education.
- Distance Learning was never mentioned as a training strategy by any of the respondents. However, many reported training difficulties which might be addressed with Distance Learning. Employees in the smaller towns and remote sections of the NEK have difficulty commuting to NEK adult education sites, much less to IT training in Montpelier or Burlington. Many employees who utilized NEK education complained that the classes were not presented at their level or made relevant to their industry. Local trainers cannot afford to produce polished, targeted education for one or two students. Distance Learning offered by local or remote educators creates virtual classrooms of students with similar needs, without imposing the inconvenience and expense of travel.

Outsourcing

Summary

Outsourcing is a commonly used mechanism for businesses to obtain needed skills without hiring or training their own personnel. In the context of IT, outsourcing can range from hiring a consultant for a few hours a year to paying another company to house, maintain and operate all data processing services required by the business. Outsourcing allows a business to have access to skills and/or equipment that it can not justify owning, but also requires the business to depend on outside expertise, and perhaps to relinquish some amount of control.

Because many of the businesses in the Northeast Kingdom are quite small, and even the largest ones have rather small IT staffs, it was anticipated that many businesses surveyed would outsource some of their IT functions. The survey respondents identified over a quarter of a million dollars spent on outsourced IT services, with 60% of the funds going to companies outside of the NEK. Over a third of these businesses anticipate a growth in their expenditures for these services, while only 11% expect their expenditures to decline.

Outsourcing represents a business opportunity for local service providers, who can leverage their expertise and their investment in advanced training by providing services for other local businesses.

Observations and Recommendations

- Although many of the businesses in the NEK reported limitations in their in-house IT skills, only limited use of outsourced skills was reported. This appears to be due to:
 - **A lack of business justification for expenditures on outside services.**
Very few business owners/managers seem to have gone through the calculation of lost time/productivity/function versus the cost of outside assistance.
 - **A perceived lack of qualified service providers.**
Some businesses reported disappointing experiences with the knowledge level of local IT services. Others commented that outside service providers were technically competent, but not always available or did not adequately understand the customer's business to apply the technology correctly.
 - **An under-reporting of outsourced tasks.**
None of the respondents appeared to include the costs of internet service providers or email service providers in their outsourcing figures, although, clearly only a handful of the largest companies in the region do these functions internally. There was also limited reporting of web site design or development, although many businesses have web sites with notations of outside creation.
- The outsourcing of the more technical IT skills would appear to be a prudent business strategy for many NEK companies, as the typical business is too small to require or to be able to afford full-time, highly skilled IT technicians.

FINAL OBSERVATIONS AND RECOMMENDATIONS

It is clear from the survey results that the use of IT technology is firmly in place in the Northeast Kingdom, and will continue to rise. The vast majority of the IT technology is desktop PCs, and

in the near future that is where the growth will continue. The staff required to support the small population of midrange and mainframe servers is not likely to grow, unless there is a major change in the local economic development pattern, and, although these skills are more difficult to find, it is doubtful whether developing local training programs for these environments would be practical.

The survey data, combined with the anecdotal information gathered, indicates that the NEK workforce requires increased skill levels in the following areas:

1. **How Things Work:** Many employers and IT support staff reported that although the general IT users possess or can quickly learn basic skills such as keyboarding, basic word processing, etc., few workers have an adequate understanding of how the underlying hardware and software works. When a minor problem arises with an application or a worker needs to perform a slightly new computer task, he or she has no frame of reference to try anything new. This becomes a productivity issue for both the worker and for others in the company who must stop their work to assist. This lack of basic understanding also may make the daily tasks less efficient. Many respondents told tales of workers who re-typed repetitive information rather than cut/paste, or used a hand calculator to sum figures in a spreadsheet.
2. **Intermediate/Advanced Office Products:** Microsoft Office and similar products are the most commonly used software packages. The local schools and on the job experience appear to be providing sufficient basic skills in these areas, but many businesses reported a need for more advanced skills in word processing and spreadsheet products, as well as at least some knowledge of presentation and database products.
3. **Hardware/Software Support and Networking:** These skill areas were required by many businesses, and noted as being difficult to find. IT education currently available in the NEK only covers the basics of these topics.
4. **Technology Possibilities for Management:** The majority of the use of IT in the NEK is quite basic. Business owners and managers need to be made aware of more creative applications of technology, and given the skills to evaluate their feasibility.

Several strategies could be employed by the NEKWIB to provide this expanded training:

1. **Develop IT Training Syllabi with NEK Businesses:** Rather than commissioning further studies to explore the details of the IT training requirement, convene workgroups of local businesses to define the content of the needed education. Once completed these syllabi can be used by local education providers to develop training programs and to evaluate programs from sources outside the NEK.
2. **Facilitate Bringing Advanced IT Courses to the NEK:** Both national and Vermont-based IT education providers will travel with their instructors and courseware. The extra costs involved in the travel may need to be subsidized, although these could be absorbed by well-attended classes. The WIB could locate facilities and equipment for the classes, and market the program to ensure good attendance. Some of the larger employers in the NEK, such as the State of Vermont, already have contractual arrangements with IT education providers that provide for remote classes at attractive prices. The WIB could work with the employers and providers to leverage the classes across a broader number of businesses.

3. **Facilitate Bringing IT Seminars to the NEK:** Many vendors of IT products are willing to present informative industry topics for a sufficient audience. In more urban areas, these are often sponsored by IT user groups. In the NEK, these might be hosted by local Chambers of Commerce, industry groups or the WIB itself.
4. **Promote IT User Group:** The WIB might take a leadership role by working with local businesses and national IT user groups to establish appropriate user groups within the NEK for information sharing and educational purposes.
5. **Leverage Educational Tourism to Provide Local Training:** Educational tourism is becoming increasingly popular. A longstanding example of this is the Elderhostel program, where senior citizens spend their vacations for an organized combination of travel, recreation and education. The concept is also in the rise for younger vacationers. The NEK has all the amenities required to support the recreational aspects of such an offering. If, for example, a “Ski and Learn Networking” package covers the cost of bringing expert educators into the area, local employees might be able to attend the education sessions at reduced cost, or attend a second session of the classes while the vacationers are on the ski slopes.
6. **Promote Distance Learning:** Current distance learning technology allows local students to participate in a rich, interactive educational experience from very remote locations. Although early distance learning was not much more than on-line self study courses, today’s technology allows the students to hear, see and interactive with the instructors and the other students. Many distance learning technologies require minimal student computer equipment and are effective using standard telephone line speeds. This technology would be especially valuable for the work force in the more remote sections of the NEK, but also can be used to bring advanced education to all NEK employees.

The charter of this survey was to study the IT skills needs of the current work force and the anticipated IT skills needs of the existing business base. But the NEK economy is changing. Many of the well-paying manufacturing jobs have already left the region, and more will follow. Growth in the agricultural sector is hampered by low milk and timber prices. Local retail and service enterprises are limited in their growth by the lack of a local marketplace. Internet technology provides a means to expand the marketplace, and other IT technologies can increase the efficiency of dairies and loggers. And to employ these technologies, the local businesses and work force must have the knowledge to understand and implement new IT products. The NEKWIB could join forces with the areas economic development resources to both nurture new economic development, and to provide the training to support that development. A few ideas for economic/educational projects are:

1. **Provide a NEK Regional CIO:** Large corporations all have a Chief Information Officer, whose charter is to provide applicable current IT technology information to the corporation, to evaluate the return on IT investments, and to oversee implementation of new IT technology. The businesses in the Northeast Kingdom are too small to be able to afford or to fully utilize a CIO, but a shared resource could assist many businesses.
2. **Support e-Commerce Pilots:** A few NEK retailers have expanded their marketplace by establishing an Internet retail presence. Other retailers, local craftspeople and manufacturers could also benefit from the technology. Economic underwriting of some pilot

projects and targeted education of the design, implementation and administration of e-Commerce sites could foster this expansion.

3. **Create the “Silicon Forest”:** The NEK needs new clean industries to replace the decline of manufacturing, and the growing IT industry is a perfect fit. The IT industry is no longer confined to a few concentrated sections of the country, and there are many factors which encourage moving IT functions to remote locations. The NEK has a trainable workforce and a local economy that supports competitive salaries. There are many, many possibilities for IT businesses in the NEK, such as:

- **Help Desk in a Barn:** Essentially every computer product – and many non-computer products – is supported by a help desk that is remote to the product’s users. Originally this function was located where the product was created, but this is becoming less common as programming and computer manufacturing operations have spread across the country and the world. Large US computer corporations like IBM and Microsoft are encouraged to promote socially-responsible programs, and the NEK’s REAP status might be an incentive to obtaining their support. Intensive, targeted training is, of course, key to implementing this concept.
- **Contract Programming:** In the past few years, many US software companies have contracted an increasing amount of programming work to Asian countries, particularly India and Pakistan. Recent unrest in that part of the world has caused some companies to re-think this strategy, providing a window of opportunity. Like the help desk idea above, this work can be done essentially anywhere that has a communications connection, including in a refurbished barn.
- **Disaster Recovery Site:** Information processing is critical to most large businesses, as well as smaller businesses in industries such as banking. A fire or flood at a corporate data center could cause the demise of the entire business, so most data centers make provisions for offsite disaster recovery. Very large enterprises maintain their own disaster sites, which may be left vacant or used for lower-priority processing until a disaster occurs, but most businesses contract with shared facilities, on the assumption that they will not all need the facility at the same time. Recovery sites in the NEK have the advantage of being isolated from the risks associated with metropolitan areas yet easily accessed from New England and Quebec, and have economic considerations that might lower the operational costs of such sites.

One final comment: Several participants in this study were frustrated that they were over-surveyed, but that nothing ever seems to change as the result of all the surveys. Those who requested it will receive a summary of the study itself, but the follow-on actions from this study ought to be communicated back to the survey participants and to the general public by the NEKWIB.