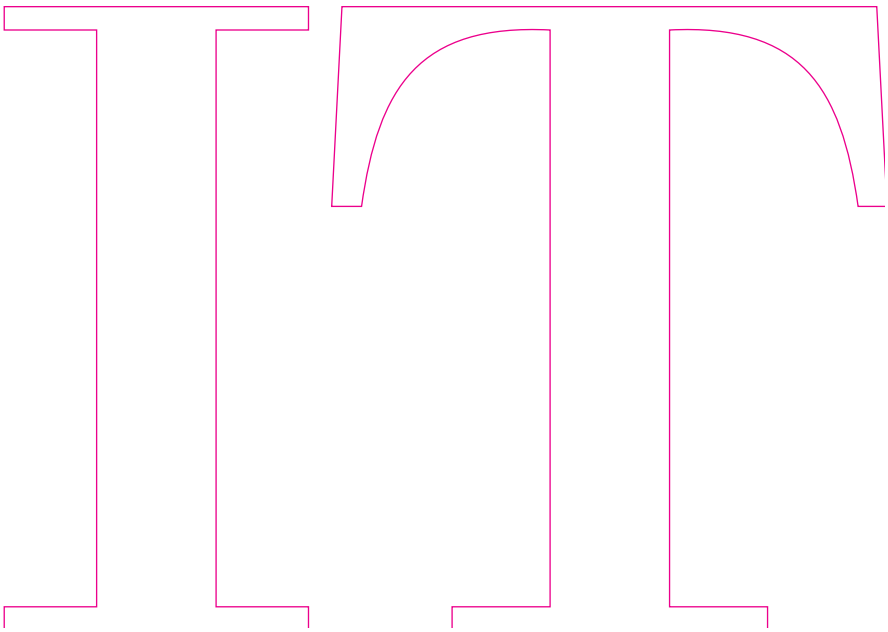
growing



opportunities for the capital area

highlights

"With the collapse of the auto industry in Michigan, the state will look to IT to help boost the local economy. We need to invest in the sector if we want to recover from this state recession."

— Scott Morrison
Vice President of Marketing
Sircon Corporation

• **The information technology (IT) industry is one of the fastest growing in the capital area.** Between 1998 and 2004, IT grew by 20 percent, about seven times faster than the rate for all jobs.

• **The IT-producing industry – the companies directly engaged in the digital economy — provide 4,500 jobs in the area.** The local IT industry is more than 300 companies strong.

• **IT occupations, IT workers in any industry, provide more than 9,000 workers in the region.** These jobs include IT professionals working outside the actual IT industry at banks, schools and more.

• **Employment opportunities in the capital area region abound at high pay in an extensive range of IT-related occupations and skills.** Earnings in the IT industry alone are 75 percent higher than the average for all industries.

• **A shortage of IT workers spanning a broad range of skills and occupations threatens the future of the digital sector in the capital area.** IT companies in the region are enjoying explosive growth, creating the jobs of the 21st century, however, they cannot find the workers they need to sustain their presence and grow here in the capital area.

• **The educational requirements of IT jobs are high, with most jobs requiring some college or bachelor's degrees and beyond, however, student interest in these careers is way below industry needs.**

• **There is an extensive range of education and training programs** in the area to meet the need for workers in the IT-industry and the lifelong training needs of workers in IT-related occupations.

• **The vitality and opportunities available within the local IT industry are often overlooked, or completely off-the-radar, among capital area businesses and residents.**

what is the information technology (IT) industry?

People use or encounter the impact of computers, the Internet, wireless communications and a whole range of digital devices every day. Whether they use IT, the "digital economy," "computing," or the "information and communications" as names for the industry, there is little question about what it is.

"The digital revolution has altered our relationship with information itself."

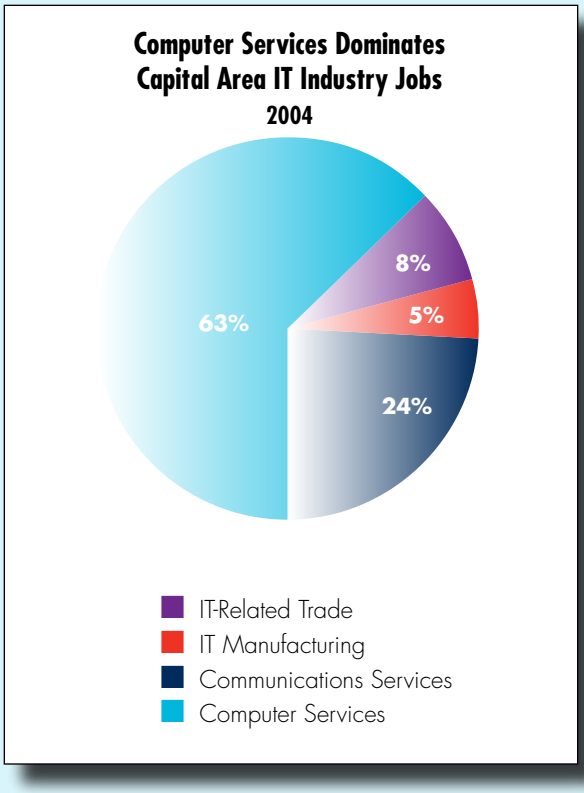
— Digital Economy 2003
US Department of Commerce

Measuring IT and its impact is another matter, however. Depending on the definition of the range of IT, government statistics do not fully recognize the industry to the point where employment statistics are published on a monthly or yearly basis. The industry is scattered across the manufacturing, trade and service sectors. Data are only available in special tabulations and studies. This report on the IT industry for the capital area relies on these special informational sources to describe the impact of IT in the capital area.

Although the IT industry is very young, its rapid diffusion across the economy and social aspects of our lives forces comparisons to the industrial revolution in terms of impact. Terms like the "information age" and the "knowledge-based economy" have their roots in the birth of computers, microprocessors and the Internet. The bottom line is that IT has transformed our lives like few developments in history.

For the purpose of this report, IT is broadly defined, adopting the use of the term as developed by the U.S. Department of Commerce in the "Digital Economy 2003." The information technology industry produces computer and telecommunications equipment, sells these goods to consumers and other business and provides computer and telecommunications-related services. The sector includes companies that produce equipment such as electronic components for IT-related devices, wholesale and retail trade outlets selling computer and telecommunications products as well as firms producing software, hosting web sites and databases and providing wireless and satellite communications infrastructure and access. Workers in IT-producing industries cover a broad range of occupations (management, production and administrative occupations in addition to IT-related occupations). IT-related occupations are not limited to just this "digital" sector of the economy: they occur in almost every industry.

IT companies provide 4,500 jobs in Capital Area



The IT industry accounts for a relatively small share of total private employment in the region. With approximately 4,500 capital area jobs, the IT industry accounts for three percent of private employment, just under construction's share of four percent. Retail trade (16%), health care and related (14%), and the manufacturing (13%) industries – all exceeding 20,000 in employment – account for more jobs, but the IT industry's explosive growth make it a vital and vibrant sector in the region.

Computer services are by far the largest component of the local IT industry. More than 6 of ten jobs involve work in this segment. Total jobs were 2,900 in 2004. Key components are:

- Data processing and hosting services;
- Software publishing; and
- Custom computer programming.

Communications services accounts for the next largest concentration of IT jobs. Accounting for almost one-quarter of the industry, communication services firms produce 1,100 positions. The biggest segments are:

- Wired telecommunication carriers;
- Cable and related distributors; and
- Cellular/wireless services.

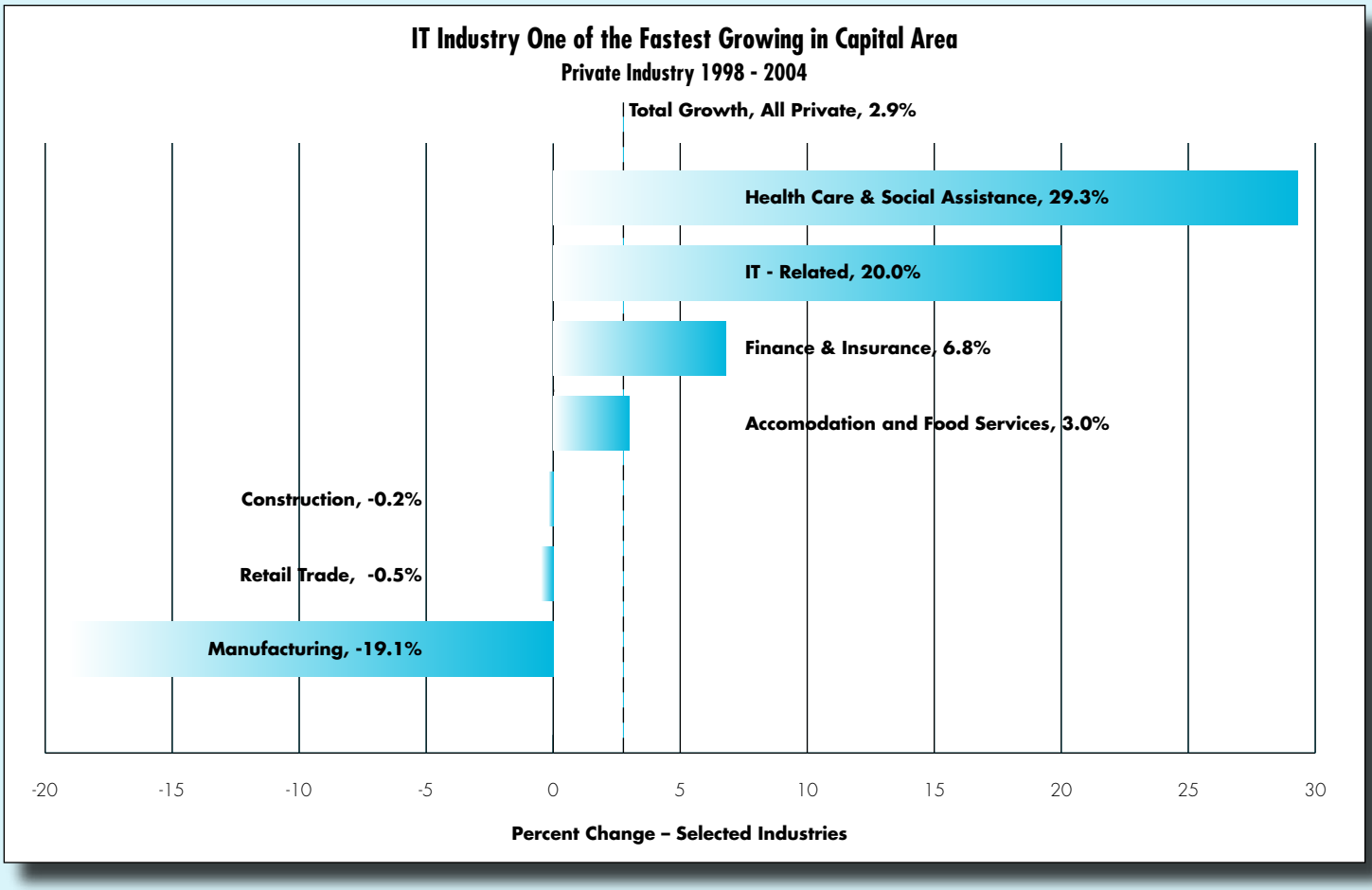
Trade – both at the wholesale and retail level – provides a fairly small number of jobs. With employment at 350, jobs in IT-related trade are equally divided between wholesale and retail. Manufacturing of IT related goods in the region is very minor too, producing 250 jobs and accounting for only five percent of the local IT sector.

Approximately 300 IT companies compose the IT industry in the capital area. Most companies are relatively small with about 15 employees per firm on average. Computer services firms account for slightly more than one-half of all IT companies in the region.

IT industry growth 7 times the rate for all industries

Information technology is a bright spot for the local economy. In terms of growth rate, IT is one of the fastest growing industries, growing by 20 percent from 1998 to 2004. This growth rate is about seven times the rate for all industries. The average for all private industries was around three percent during this period.

With manufacturing, retail trade and construction all declining from 1998-2004, IT outpaced other growing industries such as finance and insurance and the accommodations/food service sectors locally. Few industries grew faster than the IT industry.

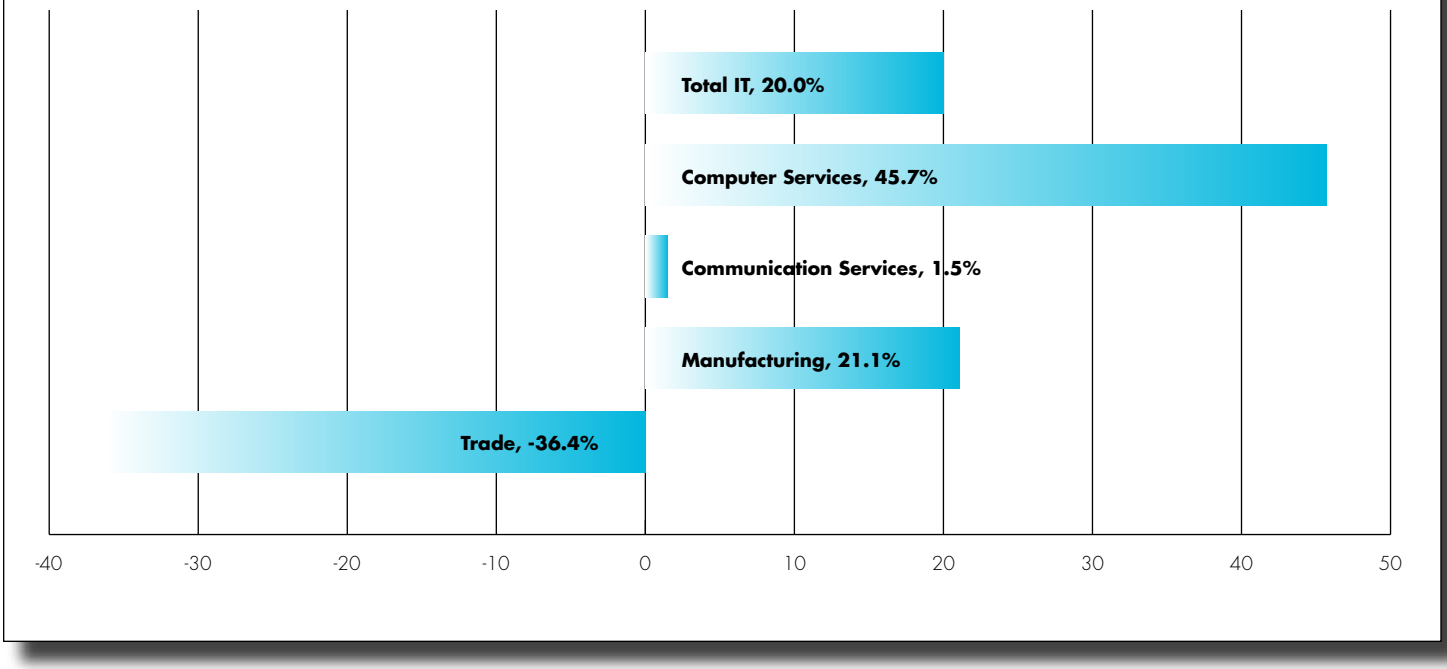


The overall growth in IT in the capital area between 1998 and 2004 follows national trends, growing through 2000 and then declining significantly. IT jobs nationally grew twice as fast as total employment and added nearly two million jobs between 1993 and 2000. Between 2001 and 2004, nearly 400,000 jobs were lost. Since then, IT jobs nationally rebounded slowly but have not returned to pre-recession levels by early 2006. Significant job losses occurred in IT locally as well with about 1,000 jobs lost between 2001 and 2004. Data are not yet available to determine if the capital area has recovered these 1,000 jobs but many local companies in IT are growing and hiring significant numbers of workers in 2006-2007.

Since 1998, the computer and related services subsector of IT is the job-growth engine of the capital area IT industry. While local IT grew by one-fifth overall, the computer services segment rose at more than double this pace by increasing by 46 percent. Communication services was very stable (+2%) and the manufacturing component advanced at about the same pace as the IT industry in total. The manufacturing segment is small, however, accounting for only about 230 jobs in 2004 versus 190 in 1998.

The dominance of computer services is even starker when absolute change is considered. Computer services are responsible for virtually all of the growth in IT. The sector as a whole gained about 750 jobs between 1998 and 2004. Computer services accounted for all of this growth and more by increasing by 900 jobs to offset losses of almost 200 jobs in the trade sector. There was only a small change in the number of jobs for IT-related manufacturing and communication services.

Computer Services Fastest Growing Component of Local IT Industry
Capital Area, 1998 - 2004



more than 9,000

IT jobs embedded in local businesses

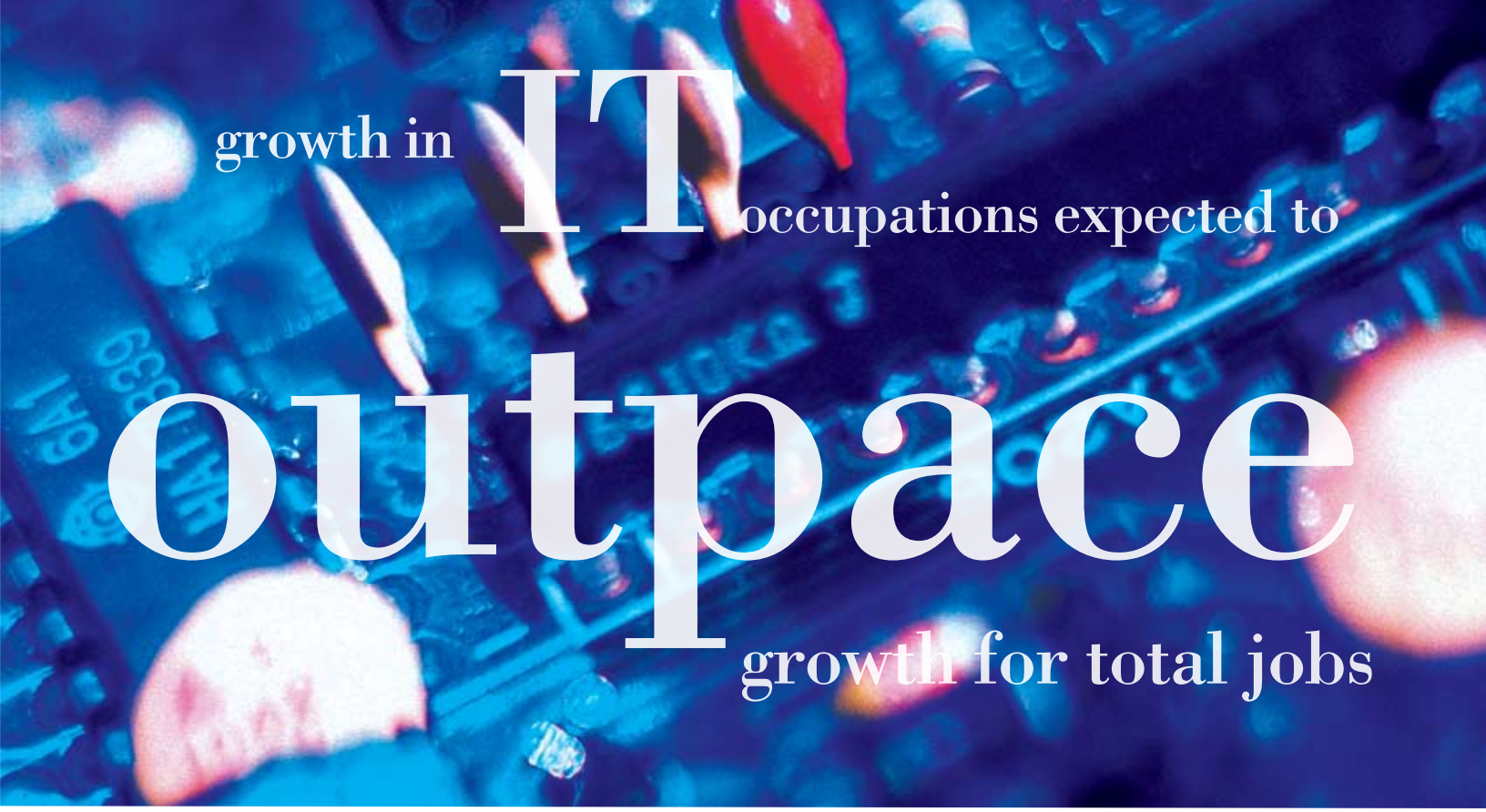
IT-related occupations (occupation is to worker as industry is to company) range from managers of information systems to equipment operators to telecommunication equipment repairers. Some major categories of employment include managers, software development occupations, hardware-based jobs and occupations focusing on inputting information into information systems.

The U.S. Department of Commerce defines IT-related occupations as those jobs where workers are involved in conducting electronic commerce as well as those maintaining the infrastructure to support such commerce. In the capital area, 27 occupations meet this definition. During 2002, nearly 9,200 workers held IT-related jobs, accounting for about four percent of employment.

Surprisingly, with the university and state government presence and less dependence on manufacturing jobs than statewide, the capital area share of IT-related jobs is identical to the Michigan share (4%).

IT Occupations in the Capital Area
2002- 2012

Occupation	Employment 2002	Employment 2012	Projections Numberic Change	Projections Percent Change	Projections Annual Openings
Total, All Occupations	245,047	269,241	24,194	9.9	8,651
Computer & Information Systems Managers	327	451	124	37.9	18
Engineering Managers	218	260	42	19.3	8
Computer & Information Scientists, Research	7	9	2	28.6	0
Computer Programmers	741	827	86	11.6	27
Computer Software Engineers, Applications	344	534	190	55.2	22
Computer Software Engineers, Systems Software	232	387	155	66.8	18
Computer Support Specialists	773	960	187	24.2	29
Computer Systems Analysts	1,689	2,083	394	23.3	58
Database Administrators	124	175	51	41.1	6
Network & Computer Systems Administrators	318	440	122	38.4	16
Network Systems and Data Comm. Analysts	100	152	52	52	6
Computer Hardware Engineers	12	18	6	50	1
Electrical Engineers	180	195	15	8.3	6
Electronics Engineers	74	88	14	18.9	3
Electrical & Electronic Engineering Technicians	215	245	30	14	8
Telecomm./Switchboard Operators	336	319	-17	-5.1	9
Billing & Posting Clerks & Machine Operators	914	938	24	2.6	18
Computer Operators	460	322	-138	-30	10
Data Entry Keyers	727	621	-106	-14.6	17
Office Machine Operators	92	86	-6	-6.5	2
Electrical Power-Line Installers & Repairers	105	112	7	6.7	4
Electrical & Electronics Repairers	118	135	17	14.4	5
Computer, ATM, & Office Machine Repairers	372	387	15	4	7
Telecomm. Equipment Installers & Repairers	261	267	6	2.3	6
Telecommunications Line Installers & Repairers	211	243	32	15.2	9
Electrical & Electroniic Equipment Assemblers	166	159	-7	-4.2	4
Electromechanical Equipment Assemblers	56	47	-9	-16.1	1



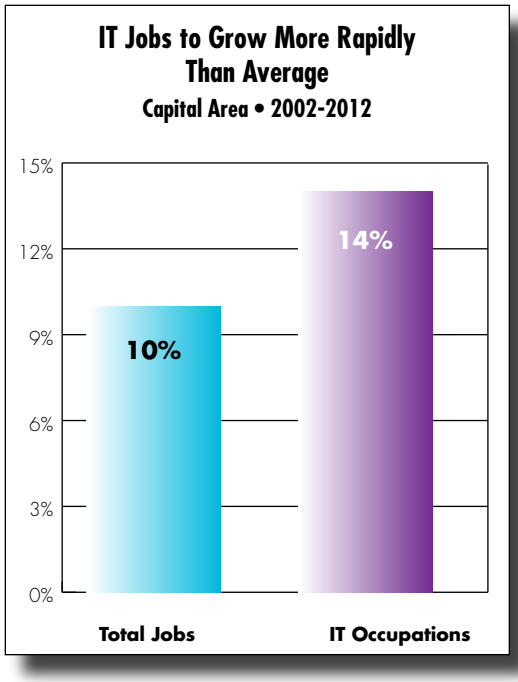
IT-related occupations are expected to grow more rapidly than all jobs in the capital area for the 2002-2012 period. While total employment is projected to grow by 10 percent, IT jobs are expected to grow by 14 percent or about 40 percent faster than all jobs. A few occupations with rapid growth rates and significant employment in the area include:

Software Engineers – 55-67%
Network / Data System Analysts – 52%
Database and Network Administrators – 38-41%
System Managers – 38%
Computer Support Specialists and System Analysts – 23-24%

Nearly 1,300 jobs are expected to be added to occupational employment related to the information technologies between 2002 and 2012 in the capital area. This accounts for about five percent of total anticipated job growth.

Among the Ten Fastest Growing Occupations in the Capital Area Four are IT-Related
2002-2012

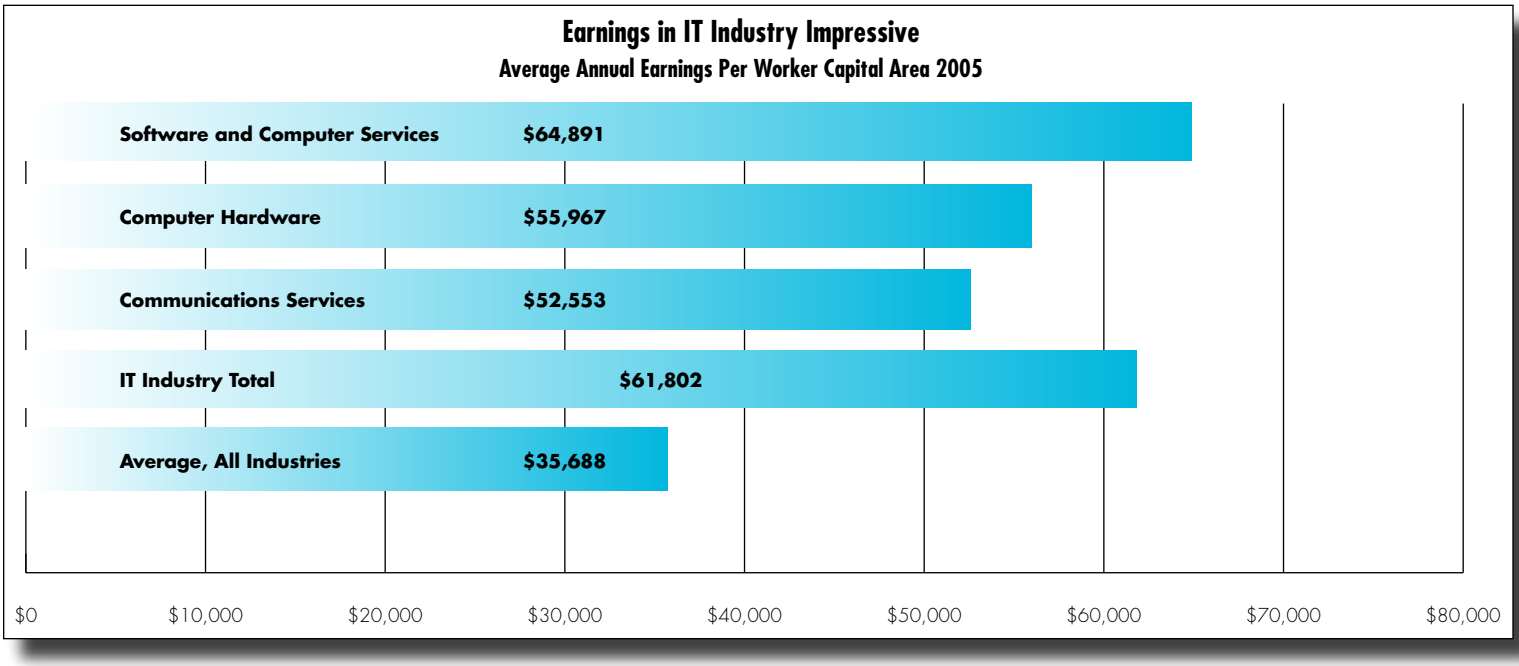
Occupations	Percent Job Growth
Computer Software Engineers, Systems Software	66.8
Computer Software Engineers, Applications	55.2
Home Health Aides	40.3
Self-Enrichment Education Teachers	39.7
Amusement, Recreation Attendants	39.3
Network/Computer Systems Administrators	38.4
Management Analysts	38.1
Computer/Information Systems Managers	37.9
Medical Assistants	37.4
Personal Financial Advisors	35.1



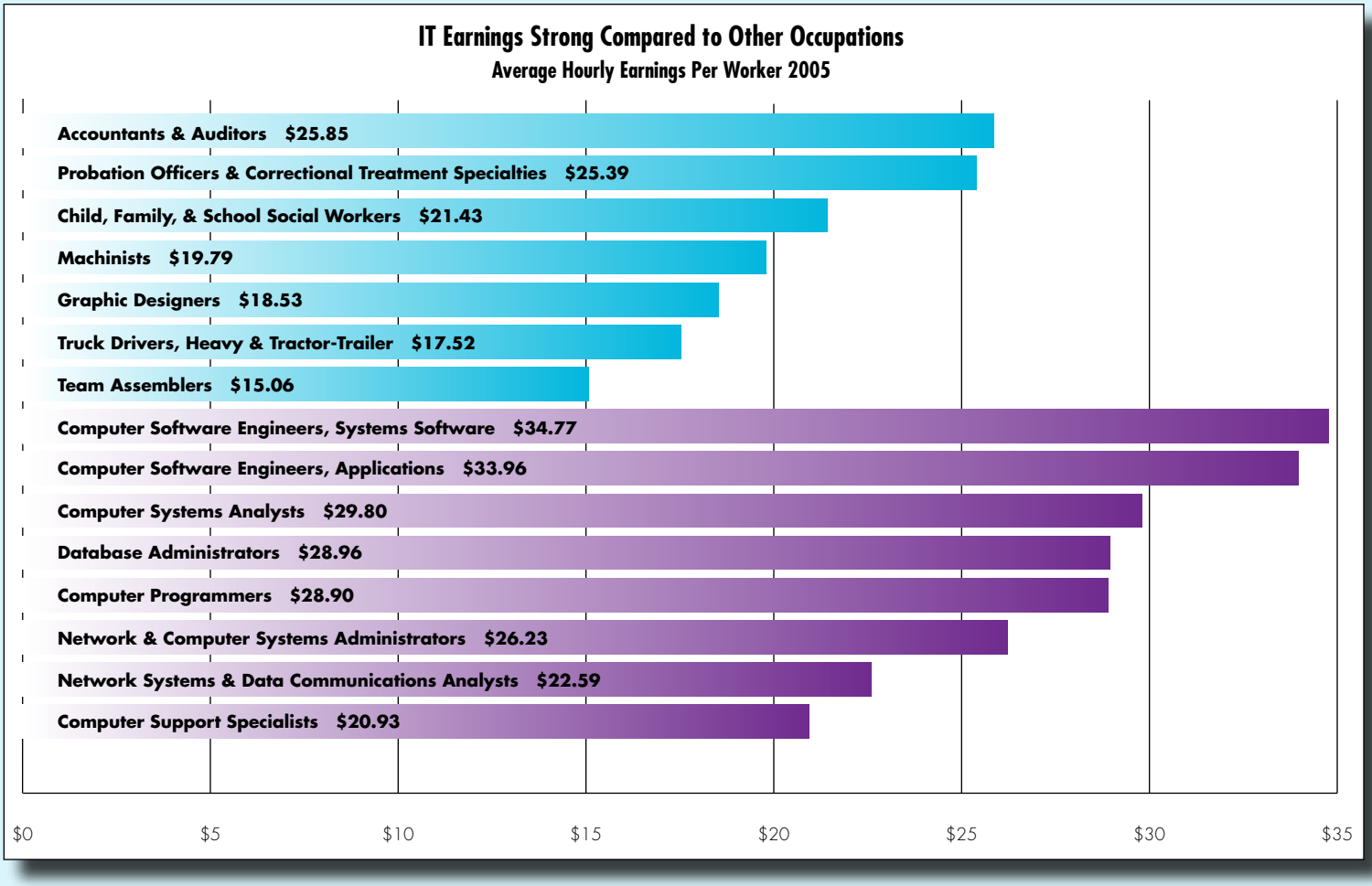
earning in IT sector nearly 75% higher than average

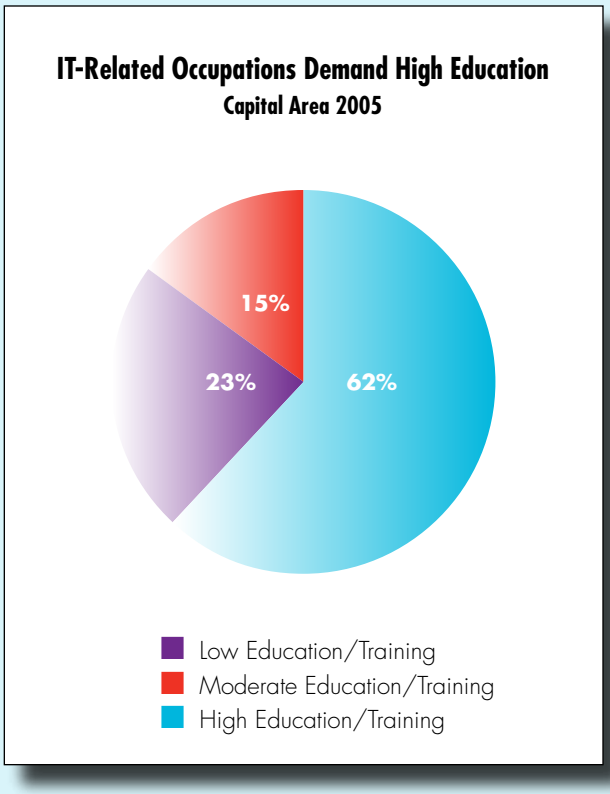
The capital area information technology sector pays its workers more on average than other industries. While the all-industry average (private sector) in 2005 was almost $36,000 annually, wages in IT averaged nearly $62,000. This earnings level in IT is 73 percent above the average for all private sector industries.

All three major sectors of IT are above the industry average. Software and computer services average the highest at nearly $65,000 per year (82% higher than average). Communication services pay the lowest at $53,000 annually and computer hardware averages nearly $56,000 per year.



The high-pay characteristic of IT is not just limited to those working in the industry itself. Occupational pay statistics demonstrate that working in areas of the economy that use IT tools and technology pays off for workers in technology related occupations. For example, accountants and auditors earn approximately $26 per hour on average in the capital area (2005). Programmers, however, earn $29 on an hourly basis as do database administrators. Computer support specialists earn $21 compared to assemblers earning $15 per hour.





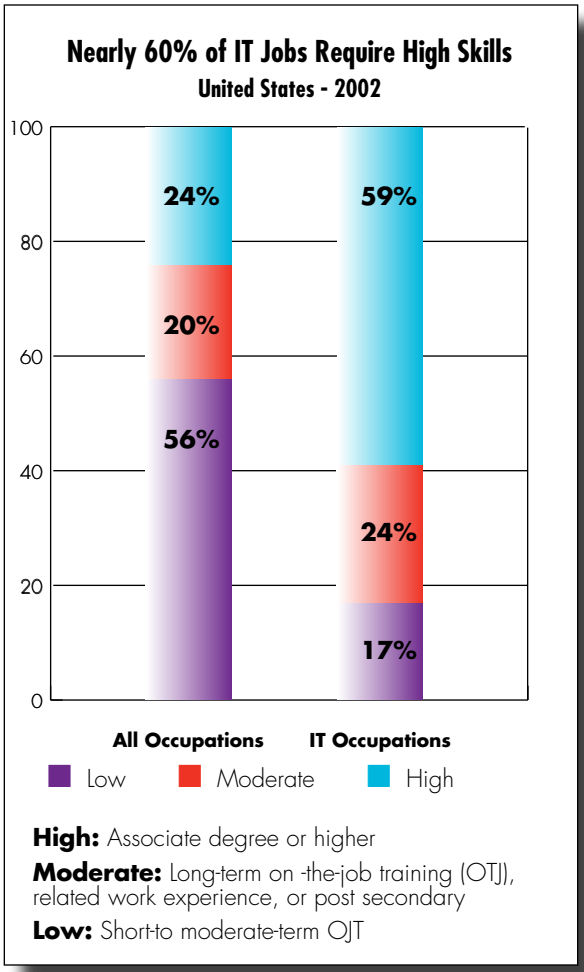
The chart to the left and the foregoing pay statistics demonstrate the reality of the knowledge-based economy. High pay is associated with knowledge. Knowledge is associated with higher levels of education and training. Nearly two-thirds of the occupations associated with the IT sector in the capital area are linked to the highest levels of education and training (associates degree or higher).

"If you have not had a solid math and science background by junior high, you will probably never work at TechSmith."

— Don Nourse
Vice President of Finance
TechSmith Corporation

IT occupations require high levels of skills and skill change ever-present

One of the most significant characteristics of work in information technology is the high skill requirement of the jobs. Relative to the high-skill and low-skill mix of all jobs in the economy and those in IT, there is a dramatic difference. High-skill jobs in the digital economy are nearly 60 percent of the total, 2.5 times greater than the high-skill occupations in the total economy (24 percent).



High: Associate degree or higher

Moderate: Long-term on -the-job training (OTJ), related work experience, or post secondary

Low: Short-to moderate-term OJT

The other key aspect about skills in the IT sector is the constant change and evolution of new skills and occupations. Technological innovation and shifting demands by consumers and business guarantee more change into the future. There is no data on, or measure of, this change to summarize it graphically. However, it is observable:

- IT has evolved from a very basic data processing and storage technology to very complex technical operation in the business setting and the consumer product/service market;
- The evolution from mainframe computer to minicomputer to personal computer to networks and the Internet brought broad and extensive change to occupations and skills;
- Changes in software from COBOL to C++ to recent developments in JAVA and .Net continue to alter skills in demand by the IT labor market;
- There is a resurgence in Linux and Apple's MAC operating system and therefore an increase in skill demands in these areas; and
- The convergence of the Internet, wireless telecommunications and video technologies will continue to create new occupations and skills.

Examples of changes in IT are too abundant to list. The dynamic nature of IT has important implications for education and training providers, workforce development and career explorers: information exchange between industry and education on changes to jobs and in skills is vital to ensuring an adequately prepared workforce for the IT industry.

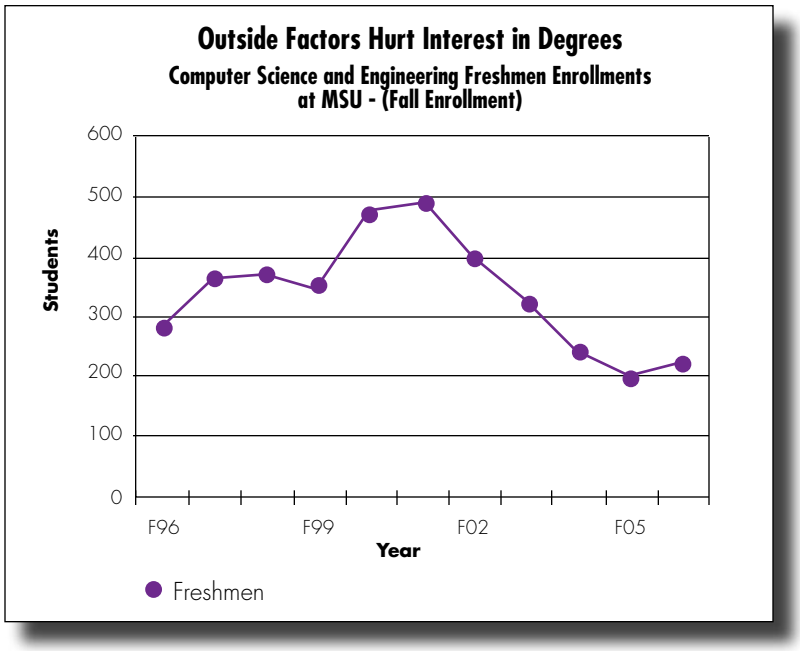
opportunities abound for local IT industry

The IT industry in the capital area is enjoying robust growth in early 2007. This growth is largely concentrated in the computer services sector – the largest component of the local IT sector. Software development and publishing and Internet-related services, including web hosting, data processing and systems design, are the major sectors. Much of this growth is linked to young firms in the area enjoying a significant growth spurt.

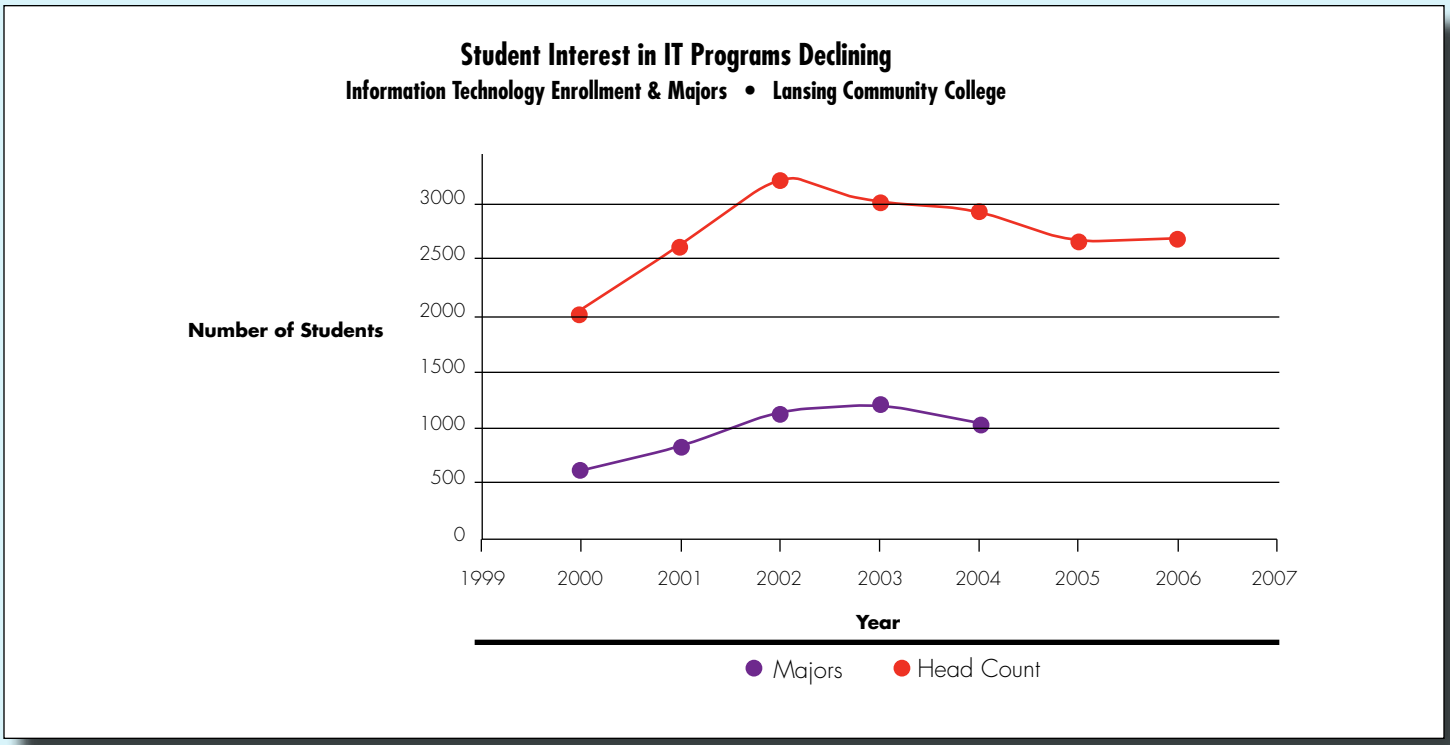
The industry is concerned about its ability to find workers in the capital area and recruit sufficient talent to grow the industry locally. There are several factors hindering the industry:

- There is a very low level of awareness of the local IT industry. Industry representatives believe the industry is under the radar of people in the community. Many in the industry state local IT is undervalued and underappreciated. And although a Google announcement in Ann Arbor or a report of a graduate-level programming degree in serious gaming at MSU draws occasional attention to the local IT sector, people and businesses still seek IT-related services and jobs out of the area because of a lack of appreciation of the local industry.

- The hangover from the "dot-com" bust is still with us. While computer and IT-related programs were popular with university students in the late 1990s, the fallout from the retrenchment in IT is still being felt in postsecondary education as enrollments and degrees awarded are not in line with industry trends. The chart on freshman enrollment in two IT-related programs at MSU is an indicator of this pattern. The number of degrees awarded in computer science and engineering programs follows a similar trend. These student trends explain why local companies in IT cannot find the workers they need. Myths and inaccuracies about the industry plague recruiting efforts.



- The trend in enrollments at Lansing Community College is the same. Both headcount (students taking any IT-related course) and declared majors show declines beginning in the early part of the decade. The upside is that despite the declines there are a large number of students in IT courses at LCC (3,200 in 2002) and attending the community college to upgrade their skills and pursue IT careers. There are another 500-700 students in other IT-related curricula. At MSU the Computer Science and Engineering (CSE) department reaches 4,400 students with a single course it offers. What can be done to tap into this large pool of students and recruit them into IT-related careers to match the jobs available in the capital area?



- IT skills are in demand across the entire economy and not just the IT industry alone. Manufacturing, construction, government and universities are all looking for workers with IT skills. With student interest so low, too many employers are competing for too few workers in 2007.

- The IT sector is very dynamic. Technology change abounds. As a consequence, skill change emerges and requires a response from education and training providers. One example of this is the ongoing shift for some functions to the Linux operating system. Local firms needing workers with Linux skills cannot find them and Linux-based training programs are not widespread.

According to the Education Research Institute at UCLA, interest among prospective students in computer science as a major dropped 70 percent between 2001 and 2005

- Relative worker scarcity is not likely to disappear as an issue in the capital area into the foreseeable issue. There are two reasons for this:

    1. The overall demographic shift from aging baby boomers means workers will be exiting the labor force in record numbers. Fewer younger workers are available to take their place. Therefore, all industries will be competing for fewer workers because of this radical shift in our workforce.

    2. Even though there is a widespread perception that the capital area is in a serious economic slowdown, in terms of the unemployment rate for the area, the economy is more resilient than the common notion. The jobless rate for 2006 averaged 5.8 percent, the same as in 2005 and little different from the 6.0 percent recorded in 2004. First, these data suggest that the capital area job market has stabilized and rising unemployment is behind us. Second, six percent is at the upper range of what economists call full employment (usually pegged in the 4-6 percent range), where labor supply and demand is roughly in balance. If the capital area economy picks up any steam at all – a likely event with several new auto plant suppliers in town hiring hundreds of workers – employers will begin to find workers hard to find again.

"There are two big myths out there — one is that you have to leave the capital area to obtain a good paying IT job. The other is that college is not for everyone."

– Travis Stoliker
Marketing Director
Liquid Web Inc.

The following are just some of the local labor shortage areas in the IT industry:

System Administration/Management
System administrators - basic and high level
Microsoft windows administration
Network administration
Firewall administration
Linux administration
Database management
Information management
Wireless network management

Development
Web developers
XML development
Java development
.NET developers
Linux development

Management/Implementation
IT managers
IT project management
Enterprise Resource Planning (ERP) implementation
Customer Relations Management (CRM) implementation

Engineers & Designers
Software engineers
User interaction designers
Test engineers
Information architects
IT Business analyst (BA) – aka business systems analyst, systems analyst and functional analyst
Usability professionals

PC/Help Desk
Apple computer skills – certified
MAC Operating System
Help desk/end-user support, especially A+ certified professionals

Security/Monitoring
Business intelligence/reporting services
Information and network security professionals

Generic Skills
Strong interpersonal skills, oral communications, writing abilities, negotiations, budgeting and IT leadership
Experience in commercial software development
Ability to adapt to technology change
Ability to break down complex operations into manageable tasks

"There are more (information technology) jobs in the U.S. today than there were at the height of the dot-com boom."

– Professor Eric Roberts
Stanford University

IT industry concerned about its future in the capital area

To prepare this report, Capital Area Michigan Works! convened an IT Industry Advisory Committee. They identified two priority issues for the industry:

1. There is a low level of awareness about the presence, size and opportunities of the local IT industry. The committee believes area businesses, residents and students have the perception the IT industry does not really exist in the capital area. Therefore, businesses seeking IT services and jobseekers interested in IT employment look elsewhere geographically.

2. There is a significant IT worker shortage in the area. All companies on the IT Advisory Committee report difficulty finding the skilled workers they need to take advantage of the high-wage business opportunities in IT in the capital area. Because of the low profile of the industry, students and workers with relevant skills move outside of the state for jobs. Far too often, local IT firms must cast their recruitment net outside of the region to find the workers they need. At the same time, there is plenty opportunity to grow our own talent.

In light of these two pressing issues, the local IT industry is considering the following action:

- Organize the industry in some way to address the foregoing issues. One vehicle for this is the recent designation as a Regional Skill Alliance (MiRSA) by the State of Michigan. RSAs are an initiative of the Michigan Department of Labor and Economic Growth designed to bring distinct industries together with the workforce development system to ensure that available jobs and appropriately trained workers match. The MiRSA in information technology will develop strategies, partnerships and ultimately solutions for the IT workforce challenges.

IT Worker Shortage Now

Hundreds of jobseekers and 20+ IT-related firms attended a Lansing area IT job fair in December 2006 – even with hundreds of candidates companies reported they still could not find all the workers they need.

"In this high-tech economy, jobs and companies will go where the talent is."

Lansing Mayor Virg Bernero

- Partner and collaborate with existing networks of IT professionals such as LINC, a regional IT development association. LINC is an active group of local professionals working in the information technology industry.

- Develop information about the capital area IT industry and an associated marketing plan to put the local IT industry on the map. This should not be a daunting challenge. The expansion and growth plans of many local IT companies have been covered extensively by the local media. The Lansing Regional Chamber of Commerce included IT as one of its target industries for recruitment and growth in the capital area (the "Pollina" study). Lansing Mayor Virg Bernero announced the formation of the BEST Initiative, Business-Education Science Technology. BEST seeks to help Lansing workers and students prepare for the demands of tomorrow's high-tech workplace. Leveraging these and other local initiatives in the region could help the local IT industry gain more prominence.

- Prepare information about available IT-related careers and jobs. Although companies need to continue their individual recruitment efforts, some joint effort may be effective. If the local IT industry is not on the "map," then employment opportunities in IT in the capital area cannot be well known either. A "Capital Area IT Career" brochure or other relevant informational materials could bedeveloped to use as an industry recruitment tool and used on company and RSA websites and other outlets. One area of widespread misunderstanding, according to local industry officials, is the difference between two of the main branches of work in IT: computer science and business technology.

    - Computer Science – deals with the technical core of computing; It involves engineering computers and networks, development of algorithms, applications, and large programs; and sometimes administration of networks or servers. This area is usually for the most technically oriented – those more interested in the technology than in the personnel and business systems used to apply it. Too many career explorers believe this is their only IT-career option.

    - IT Business Technology – here only a practical understanding of computing technology is required. This is the domain of sales personnel, project managers, business analysts, CIOs and other "generalists." People skills are important as is an understanding of the flow of information in the company. In these occupations, you do not need "to do IT." You only need to understand it, perhaps at the level needed to buy and configure information systems, or to select and purchase them.

- Develop a partnership with industry to work with Lansing Community College and Michigan State University to reach out to students pursing IT careers. There are over 3,000 students taking IT-related courses at the community college alone. Hundreds have IT as declared majors. These students could fill the needs of our local IT companies if their skills match industry needs.

- Convene an IT Workforce Action Group to monitor enrollment and graduate trends at local postsecondary education institutions to determine what the available labor supply for IT is on a regular basis. This group could also serve as an industry advisory board on technology change in the industry as well as the skill requirements of IT jobs – like a quality control group for IT education and training – to make sure we have the best trained and up-to-date workforce possible.

Notes

1. Definitions for the IT industry and occupations come from the U.S. Department of Commerce in the following report: *Digital Economy 2003*.

2. Industry employment data for 1998 and 2004 obtained from the *County Business Patterns* report from the Bureau of Economic Analysis, Census Bureau, and U.S. Department of Commerce. Much of the data by industry was only available in employment ranges and, therefore, the mid-point was used. Data for 1998 (1997 NAICS) was converted to the 2002 NAICS through a crosswalk provided by the U.S. Census Bureau (http://www.census.gov/epcd.www.naics.html).

3. Occupational employment and projections, including the share comparison between Michigan and the capital area, come from the Occupational Employment Statistics (OES) projections program provided by staff in the Bureau of Labor Market Information and Strategic Initiatives, the Michigan Department of Labor and Economic Growth.

4. The source for the average annual earnings by industry (2005) is the Quarterly Census of Employment and Wages from the Bureau of Labor Market Information and Strategic Initiatives.

5. The source for the average hourly earnings per worker (2005) is the aforementioned OES program.

6. The pie chart on the education and training requirements for occupations in the capital area for 2005 uses the education ratings (i.e. low, medium, high) from the *Digital Economy 2003*. The shares of the three groups are determined by local occupational employment data from the OES program. The chart comparing all occupations to IT occupations nationally comes from the *Digital Economy 2003*.

7. Advisory committee members from Michigan State University and Lansing Community College provided data on enrollments for their respective institutions.

8. Information about current worker shortages and the status of the local IT industry comes from discussions with the IT Advisory Committee.

"Growing IT: Opportunities for the Capital Area" was released in April 2007.

Information Technology Advisory Committee:

Clarke Anderson, CEO
A.J. Boggs + Co.

John Gilkey, President
Artemis Solutions Group

Amy Mumby, Office Manager
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Rick Brady, President
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Bob Sherer, Economic Analyst
Capital Area Michigan Works!

Doug Stites, Chief Executive Officer
Capital Area Michigan Works!

Kate Tykocki, Marketing and Public Relations Director
Capital Area Michigan Works!

Eric Tumbarella, Chief Information Officer
City of Lansing

Larry Harb, President
IT Risk Managers

Jim Carter, Director of IT Security
Jackson National Life Insurance

Radecka Appiah-Padi; Director of Instruction; Business, Media and Information Technologies Division
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