Information Technology

❖ Can Texas take information technology to a newly disruptive level?

Introduction

Information technology (IT) in the workplace has transformed the way corporations operate in the global market and has allowed small businesses access to markets outside their traditional operating areas. The ability to store, protect, process, transmit and retrieve information easily and inexpensively will remain critical to all industries as even small businesses “go global.”

Texas continues to grow its total number of IT jobs, but that growth is being challenged. The state’s foundation of universities, business-support organizations and existing companies will draw the tech-design firms and tech-design jobs of the future. Yet that path is threatened by an erosion of jobs in the cornerstone semiconductor industry, a constrained education system and limited access to capital.

Texas has lost more than 24,000 jobs in the semiconductor manufacturing sector since the peak year of 2001. This concerns many Texans who aren’t convinced that dozens of new IT start-up companies, each employing only a few people, will be enough to pull Texas into the “new economy.”

“The semiconductor industry drives a $3 trillion economy in electronics. And that [semiconductor] sector drives nanotechnology and is driving all kinds of things smaller,” said Austin attorney Pike Powers, who has been involved in growing tech companies in Texas for decades. According to Powers, Texas has been a global leader in making and designing the tiny semiconductor chips that run modern computers and electronic devices. But semiconductor companies have been shrinking their workforces in the Lone Star State. And a shrinking workforce in such a foundational industry has Powers concerned about the future of the Texas economy. “If we lose this talented and skilled workforce they might not come back — unless we can find new jobs for them in the new economy.”

What’s Happening

Structural changes are affecting companies in Texas that make semiconductors, computers, electronic products and even audiovisual equipment. Using newer fabrication plants in Asia with less-expensive labor has shifted some work overseas. And a tough economy in the United States has resulted in less demand here and, thus, less demand for workers at the Texas facilities of those companies.

Emblematic of the state’s IT cluster is Texas Instruments (TI), a global leader in semiconductor microchip manufacturing. TI’s microchips run in everything from electric toothbrushes to automobiles to cell phones. TI is trying to broaden its product line outside the traditional digital microchips used in cell phones and other digital devices for which TI is best known. But such diversification requires talent and access to new customers.

TI has been looking in 2009 and 2010 to hire technicians for its Dallas microchip fabrication plants. “Our revenues are
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— Gray Mayes, Texas Instruments

up, and our orders have been up since May 2009. There was a lot of pent-up demand from our customers over the past year. So we’re hiring,” said Gray Mayes, director of government relations for Texas Instruments. “We are struggling to hire technicians in our fabs [fabrication plants]. We’re bringing in more contractors.”

And hiring technicians with skills and experience in microchip production isn’t TI’s only concern. A core issue for the Dallas-based company is getting a steady stream of workers with a Master’s degree in electrical engineering — a challenge in Texas.

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To encourage talent development, the TI Foundation is supporting programs to test and train more high school and junior high teachers of math and science. The organization hopes that such programs will spur more teenagers to consider going to college to study science and engineering — and eventually help the company create and build future products in Texas.

TI has been trying to keep as much production as possible in the United States and in Texas, Mayes said. But face-to-face contact between TI engineers and its customers, partners and fabrication plant workers is critical for quality control and relationship development with the original equipment manufacturers that use TI microchips. Balancing face-to-face contact with customer locations is challenging, especially when 90% of those customers have their engineers and OEM (original equipment manufacturing) plants outside the United States. “It would help if we had direct flights to China from Texas,” Mayes said.

Cornerstone companies such as TI, as well as AT&T, Dell, and EDS (Electronic Data Systems, now known as HP Enterprise Services), are critical because they attract other tech companies, and even their former employees tend to start up new tech companies, said Skip Moore, lead partner of the regional technology, media and telecommunications practice at the Dallas office of Deloitte & Touche LLP. SEMATECH, a multicompany research consortium headquartered in Austin, has been a major contributor to building the IT cluster in Texas.

“We’ve got a great competitive advantage because we’ve got a great foundation from these big tech companies. We have great employers like Texas Instruments, AT&T, Dell and others that attract great companies to Texas that want to do business with them. And from that we have attracted a lot of good people here. That is the underlying core value.”

— Skip Moore, Deloitte & Touche LLP
Still, Moore has seen many big technology employers in Texas shift work to Southeast Asia.

“Even some software development jobs have gone to India and China. But the high-end jobs in companies have stayed here,” Moore said. “It’s the innovation part of all this that is really critical. Innovation is going to be around software and communications and microchips. You can’t just move all innovation to India and China. The jobs are going to be where the innovation is happening.”

But Moore and other IT industry leaders share concerns about future workers who are now in the Texas education system. According to these business professionals, schools, including junior high, high school and college, are constrained and are not turning out enough young people with an interest in engineering, much less a degree in engineering.

**The Data**

The world of IT is dynamic. Looking at vertical industry employment statewide from first quarter 2005 to first quarter 2009 shows the following highlights:

- Jobs were lost in technology equipment manufacturing and related production fields (e.g., a 4% loss in the number of semiconductor jobs and a 22% loss in the number of computer products jobs in that four-year period).
- Modest job growth (7%) occurred in data centers and gaming sector companies.
- Jobs increased in software programming and other high-tech design companies along with a strong increase in the number of those companies (e.g., 39% growth in the number of jobs at computer consulting and software programming companies).

These trends affect the Texas economy because manufacturing companies are exporters. Makers of computers, semiconductors and electronics equipment exported $32.1 billion of their goods in 2009, making that sector second only to chemical makers as the largest Texas exporter. And export sales directly grow the Texas and local economies.

But aside from vertical industries, IT-related occupations have shown growth in Texas across the industrial spectrum. According to the Texas Workforce Commission’s Labor Market and Career Information department, 10 IT-related occupations are in high demand and are expected to remain vigorous through 2016 (see Table 10.1).
The year 2009 proved difficult, even for those with established IT skills. Major IT consulting firms were shedding workers as their Fortune 1000 clients held off on projects, said Doug Wu, software executive in residence at the Houston Technology Center. But demand is up for content management, cloud computing and specialized software development.

In 2009, the Texas IT industry was also hit with both structural change and cyclical change, said Andrew Clark, president of the Houston Angel Network and a veteran of Compaq and other IT firms. These changes involve customers holding off computer, software and other technology purchases, which in turn means suppliers need fewer employees, as in the case of computer maker Dell, which closed an Austin plant and laid off workers due to lower sales. IT veterans of this industry are hopeful for a new round of technology investment to stimulate production and job growth as the economy begins to show signs of recovery.

Clark also pointed out that cyclical changes, in which companies change their entire product focus, are also being felt at IT companies across Texas, including the following organizations:

- Cypress Semiconductor Corp., which closed its 245-worker plant in Round Rock, Texas, in 2008
- Dell, which revolutionized the supply chain with superefficient factories and is now trying to sell its factories to third-party manufacturers
- Samsung, which announced in August 2009 that it is cutting 500 workers from its Austin production facility while also investing $500 million to retrofit a sister plant

There are multiple factors affecting IT employment in Texas.

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— Andrew Clark, Houston Angel Network

There are not enough venture capital firms in Texas. But Texas has fewer than 20 venture capital firms actively investing, and they invest in only four or five tech companies a year — the past normal rate of investing. The result is that too many good IT start-up firms won’t receive the money they need to get off the ground.

“There are half as many investors, investing half as much of their money,” Clark said.

The state Emerging Technology Fund (ETF) helps many Texas tech companies, but it has limits, said Walter Ulrich, president of the Houston Technology Center. ETF funding criteria call for one-time start-up funding of groundbreaking, “disruptive” technology. But because the IT industry is rather mature, most Texas IT companies don’t have a radical “disruptive” product and usually don’t qualify for ETF consideration. The ETF committee is looking for game-changing technology that is not an improvement to existing products but a completely new product that will open completely new markets. Another catch is that companies that receive ETF money cannot go back for a second round of funds to keep growing.

Another spin on the IT sector is the proliferation of data centers — large buildings that house hundreds of computer servers to run software or backup data for multiple companies — which have the added advantage of jobs for existing Texas IT workers.

Data centers filled with hundreds of servers and employing dozens of computer hardware and software maintenance workers will eventually cover Texas, said Prabhudev Konana, a professor of IT business at the University of Texas at Austin. Konana predicted that data centers, which house data for small and midsize companies, will dot the landscape of Texas within five years — somewhat like self-storage facilities for electronic information.

“You’re going to see massive data centers just for health care information storage,” Konana said. “Eventually every company is going to need a data center that...”
they can rent. We’re going to have data centers around like we have video stores all around today. And we can have it in Texas.”

“We’re in the early stages of the life cycle for data centers. These kinds of jobs are not going to go out of this country,” added Konana. “Firms are very cautious with data, especially customer data. If I ran a company, I wouldn’t want my data or my customers’ data stored in another country because of threats of terrorism or theft.”

But the economic power of data centers is still being debated. Rob Adams, a former venture capitalist and now a UT-Austin business professor, disagrees that companies will pay a premium to keep their customer data and critical information stored inside the United States. He pointed to Merrill Lynch and Bank of America’s move to create a data center in Singapore, thanks to big incentives offered by the city.

Singapore and other Asian locations have a distinct economic advantage over companies in the United States, particularly regarding worker salaries. Texas has a competitive advantage over the IT hubs of California and New England due to less-expensive workers, usually a third less in pay. But India and China have programmers and other IT workers who are more than a third less expensive than Texas workers. This is another structural challenge facing tech companies in Texas.

The advantages Texas has in the IT field are large numbers of skilled, lower priced workers and lower operation costs compared with IT centers in California and Massachusetts. But though Texas has price advantages inside the United States, even Texas cannot compete with Southeast Asia when it comes to number of skilled workers, the price of workers and the cost of running a company.

“If we want to be a leader in the IT industry of the future, we need to be a gateway to Southeast Asia,” Adams said.

“Anybody making semiconductors in Texas is just waiting to get laid off,” said Adams. “Assume manufacturing is going to go away. And assume that data centers will eventually go the way of manufacturing and will also go away.” Such is the price of global competition.

Concedes Bill Aspray Jr., professor of IT history at the University of Texas at Austin, “You will see a lessening of job loss for these manufacturers, but the job loss will continue.”

The Potential of Gaming

Few IT industries in Texas are hotter than gaming and computer simulation. One example of a gaming startup isAnaLogix Development Corp., which has three full-time employees and four contractors who have developed a wireless videogame controller that senses three-dimensional movement. The new company has survived off the savings of its founders along with a $250,000 investment from the state’s Emerging Technology Fund. AnaLogix is in Austin because, according to Ravi Rao, AnaLogix vice president and cofounder, the company’s partners were already in Austin employed in tech jobs when the company was created.

Rao pointed to the Seattle and San Jose areas as current, hot gaming industry hubs. But Rao and his partners are entrenched in Austin and are staying as they move forward with new products for gaming, health care and the military. “Austin has a gaming community, and it’s affordable here,” said Rao.
Think Globally, Plan Regionally

Crucial strategies related to IT include encouraging entrepreneurship, enticing high-tech executives and venture capitalists to live in Texas and promoting long-term investment.

“R&D is taking a big hit in the technology field. When companies invest less in R&D, you’ll see entrepreneurs step up and take the risk. Then their companies grow and either get bought out by the companies that didn’t invest in R&D or possibly become big companies themselves,” said Ryan Confer, director of operations at Innovate Texas, a tech business support organization.

Adjusting to the labor savings and balancing the distribution of workers between existing large companies and new start-up firms is the trick for Texas leaders, said Marc Nathan, director of IT entrepreneur development at the Houston Technology Center.

Making that balance is easier in the big business centers of Houston, Dallas and Austin, where companies have a large base of IT workers and many Fortune 1000 companies. These companies have their own IT staff, but they also use outside consulting firms. That population of existing technology workers could push the Texas economy forward with new ideas for products and companies, said Nathan.

“When oil is down, entrepreneurship goes up. Supporting entrepreneurship is what we should do,” said Nathan. “Focusing on an entrepreneurial culture will create white-collar jobs, especially in Houston. Nobody comes to Houston to retire. People come to Houston to work.”

Some rays of light shine bright in the IT world. Broadband remains hot as is the fiber-to-home market. The ability to securely transmit and receive information across great distances in seconds has become critical. The Organization for Economic Cooperation and Development (OECD) believes fiber optics will be the backbone of the broadband future.

Another increasingly hot field is the computer security industry, involving both hardware and software. As more companies conduct transactions over the Internet, the ability to protect financial data, both in company databases and in transit, is paramount. Increased speed and computational ability of computer microprocessors demand that security algorithms be sufficiently complex to keep from being defeated. Computer security software companies must deal with constant updates of computer operating systems and Web-browsing software, both of which create new vulnerabilities for hackers and identity thieves to exploit.

“We’re in a period of deep change structurally and technologically. You can feel the tectonic plates shifting under our feet in our roles in the technology field,” said Powers, who is involved in multiple efforts in Texas to attract, launch and grow tech companies.

In the meantime, dislocated Texas IT workers may have to brush up on new skills to obtain any of the new technology jobs. In the first quarter of 2010, according to the Conference Board, more than 24,000 jobs were posted online for computer systems analysts/software engineers in Texas. But many of these jobs require updated skill sets. An emphasis on skill upgrade training for IT workers is critical to reemploy many of these dislocated workers. Texas education institutions may need to consider more short-term certificate training programs to retrain IT workers quickly.

The glass is still half full for Powers. He pointed to the many Central Texas semiconductor plants that are creating microchips for use in energy-saving or green products. Powers also noted that Austin hosted international conventions for supercomputing and robotics in 2009, raising the profile of the capital city, and that 7 of the 10 fastest computers in the world are running on AMD processor chips that were made or designed in Austin.

“We’ve become a creative center that is attracting brilliant people,” said Powers, who believes that Central Texas is moving toward a new, computer-centered economy of supercomputing, robotics, medical devices and nanotechnology products that can change mankind.

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