



Steve Sanghi, chairman and president of Microchip Technologies, says the growth of high-tech small businesses is not only an Arizona trend, but a national one as well.

If you've ever taken a look inside your computer, you know the jumble of circuit boards and wires that make up its innards. Like wafer thin skyscrapers and data ribbon highways, these high tech components form a complex, bustling downtown. Electronic pulses dash from structure to structure in a constant state of frenetic activity.

Arizona's high tech industry hums with the same energy.

The Silicon

Bill Murray, vice president and general manager of Medtronics Micro-Rel sees the dependence of Valley firms as a positive trend.



According to a recently released report from the University of Arizona, titled *The Impact of High Tech Industry on the Arizona Economy*, the state's high-tech industry is going strong and that trend is expected to continue. While the report cautioned that state high-tech firms may rely on buying and

selling to one another too much, Bill Murray, vice president and general manager of Medtronics Micro-Rel sees the dependence of Valley firms as a positive trend.

"I didn't view that as being negative, nor does the rest of the high-tech industry," says Murray. "We see it more as vertically integrating companies and providing more value along the entire chain from components to final product."

Initially Murray was surprised to find out that two-thirds of the state's exports are derived from high-tech products. "We knew it was a large number but the magnitude was higher than we initially anticipated, so the impact was bigger," he says.

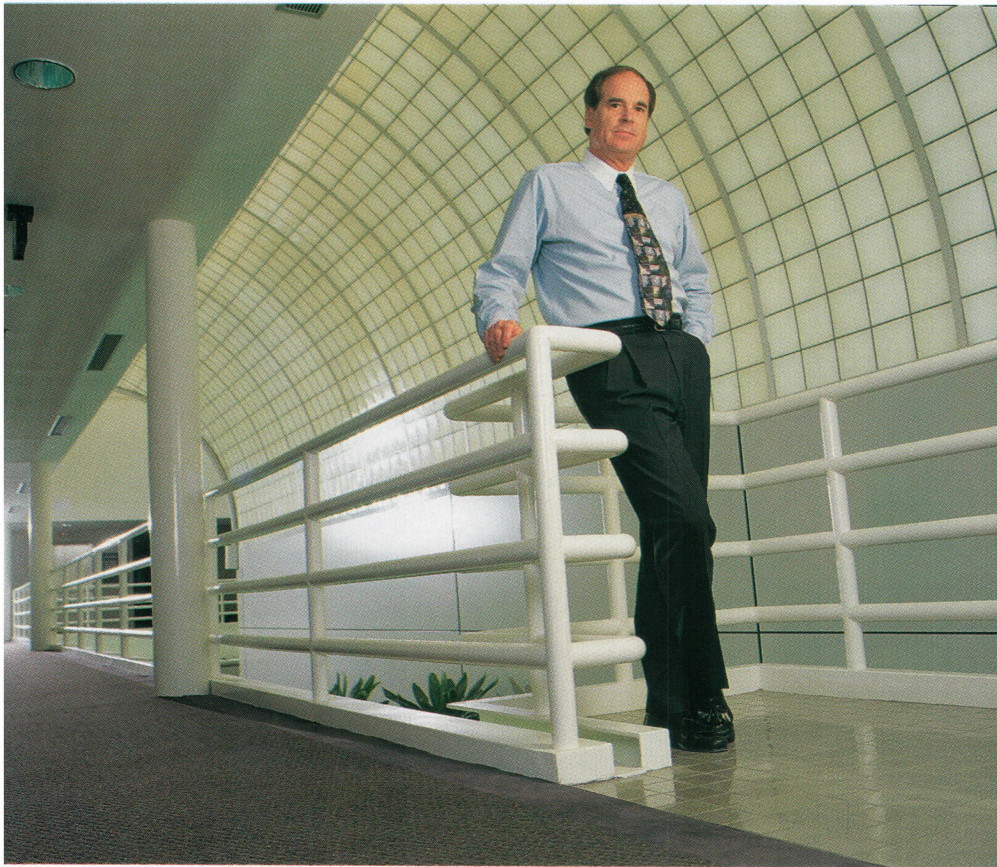
Arizona's high-tech companies generated \$9.5 billion in revenues last year and have grown steadily from 1972 to 1987. High-tech firms in the state more than tripled during this time, and employment nearly doubled. But from 1987 through 1992, employment fell 11 percent and wages dropped by 13 percent. The industry recovered a bit from 1992 to 1994, but has still not reached the 1987 highs.

Tom Beaver, corporate vice president and assistant director of world marketing for Motorola's Semiconductor Products Sector, has been with Motorola for more than 30 years. He remembers two recessions that affected the industry, one in 1975 and one in 1985. He ►

Desert

by Cynthia Scanlon

photography by Paul Hartmann



Tom Beaver, corporate vice president and co-director of world marketing for Motorola Semiconductor Products Sector, says today the high-tech industry, has pervaded all applications of semiconductors including computers, electronic motor controls and automobiles.

points out that the high-tech industry suffered because of limited markets.

"The semiconductor industry had a huge downturn because it was dependent for most of its revenue on the computer industry," he says. "We don't have that today."

Beaver says today the high-tech industry, both in Arizona and nationwide, has pervaded all applications of semiconductors including computers, electronic motor controls and automobiles. He estimates that between \$80 and \$150 in semiconductors go into each automobile coming out of Detroit. According to the Cellular Telecommunications Industry Association, cellular telephone customers grew to almost 30 million people and currently, more than 60,000 computer networks are linked together on the Internet with that number expected to rise to 1.5 million.

"I'm describing an insatiable appetite for chips," Beaver says. "I don't think we will see recessions that personified the industry in the mid '70s and '80s. Back then it was niche markets. Now it's all pervasive."

Right now, Beaver sees nothing but continued growth for Arizona's high-tech industry and points to consumers' driving "lust" for cellular phones, pocket

paggers and wireless communications. He also sees growth in the networking of personal computers as people continue to purchase personal computers for their homes and offices.

"People know all about computers," he

says. "People go into a store and ask, 'Does this have a CD-ROM?' and everyone knows what a CD-ROM stands for. It's partially because our kids, in school, have been weaned on computers. To remain contemporary and current, I have two computers at home and I haven't purchased a television in five years."

The U of A report, which cost \$50,000 and was paid for by 16 companies, including Motorola and Intel, also cites that most of Arizona's high-tech growth during the past 20 years has been in small businesses. Seventy percent of the companies surveyed said they began their operations in Arizona, and 58 percent of those began doing business within the last 15 years.

"Nearly 17 million new jobs have been created with small companies," says Steve Sanghi, chairman and president of Microchip Technologies. "Many large companies are on the decline from a job perspective, and the brutal competition of the global economy in telecommunications and computers means productivity needs to go up, and as a result you see the example of AT&T."

Murray agrees that at a macro level within the United States, small companies are creating most of the new jobs. "Although Motorola and Intel continue

to grow significantly, the smaller firms are where the good percentage of growth will come from," he says.

R. Dale Lillard, president of Lansdale Semiconductor, Inc. cites concerns that The American Electronics Association has had for more than 15 years about the shortage of engineers and high-tech personnel. "The type of people that are

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skilled are tough to find, but Arizona has a nice climate so they will come as they are needed," he says.

"Silicon Valley was generated by companies spinning off of Hewlett-Packard and Fairchild Semiconductor. Arizona is doing that now off of the semiconductor industry with Motorola and Intel," Lillard adds. "It's an important way of generating small companies and job growth."

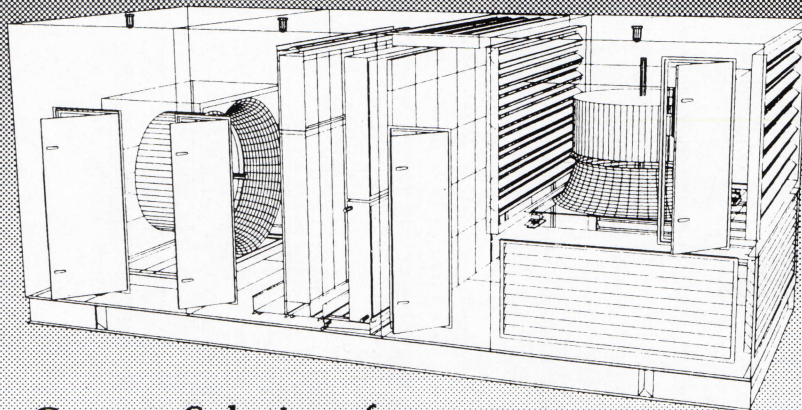
Lillard believes the future job growth for Arizona is not Motorola going to 30,000 employees, but all the support industries growing around them, and Beaver agrees.

"There's almost a cottage industry that surrounds the Intels and Motorolas," says Beaver. He cites numerous "feeder industries" such as machine shops, janitorial services and food vendors.

Big bucks

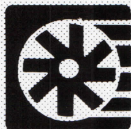
Arizona's high-tech industry has an extremely competitive pay scale. According to the U of A report, the industry employs more than 95,000 workers who collectively receive an annual salary of almost \$3.7 billion. On average, Arizona workers bring home \$45,800, almost \$7,500 more than their national counterparts.

The study also stresses that the success of Arizona's high-tech industry should be monitored and tracked, stating "If Arizona wants to encourage an increase in the number of well-paid positions in the



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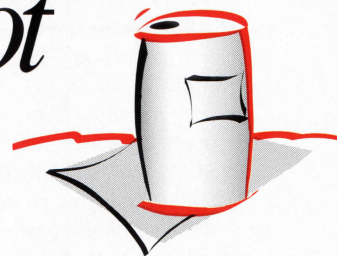


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R. Dale Lillard, president of Lansdale Semiconductor, Inc., says, "The type of people that are skilled are tough to find, but Arizona has a nice climate so they will come as they are needed."

state, paying attention to what is happening in the high-technology industry is crucial."

"Our principle competitors are in Silicon Valley, which has a very high pay scale," says Beaver. "We attract talent from Boston and upstate New York where a lot of computer companies reside, which are high pay scale areas. Candidates want to know what their pay is going to be relative to Boston or Silicon Valley."

Microchip's Sanghi cites other industries in Arizona, such as cattle, citrus, and hotel/recreation, that do not export their products and do not pay as well as the high-tech industry.

"Most of these other industries create relatively low paying jobs," he says. "The average professional job here at Microchip Technologies is around \$30 an hour. You could not stay in business with that kind of average in the farming or hotel industry."

With higher than average pay at stake, companies in Arizona can also demand highly educated and skilled workers. The issue of quality education is one that drives the success of the high-tech industry whether it is here or nationwide. Without highly educated and skilled people, the industry will flounder.

"It's difficult for the entrepreneurial industry to

survive without a continuous flux of [well] educated students and a research body," says Sanghi. Despite the shortages of engineers, most in Arizona's high-tech industry believe that all of the Arizona universities are turning out top quality

candidates.

"We have a tremendous relationship with ASU in terms of further training," says Beaver. "Our employees can get graduate degrees, which we pay for." Beaver also mentions the quality people coming out of DeVry Institute and the University of Phoenix.

The U of A report did note that some high-tech sectors are under-represented in the state such as chemical, computer and office equipment.

Motorola's Beaver looks for Arizona's distribution to grow over and above manufacturing in the coming years.

"Industrial distributors such as Hamilton Hallmark Electronics in Chandler are moving more and more products to Arizona from Southern California," he says, citing several other companies doing the same thing. "Our airport is going to get real busy."

Lansdale's Lillard also feels the chemical industry will see a boost in sales because they will have to support the wafer fabs.

As for the future of Arizona's high-tech industry, Sanghi sees some important ingredients that must be in the mix if Arizona is to continue its successful rise. The first is a continuous supply of highly educated

workers and entrepreneurs. He feels, as the others do, that the Arizona universities are doing a good job turning out qualified candidates. He also believes that Arizona always has and always will have the needed entrepreneurs to start and grow new companies as new technologies arise. A problem area that Sanghi sees needing

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attention is that of venture capital for fledgling companies. His concerns center around the lack of adequate start-up money to fund good ideas. The U of A study concurs with Sanghi, pinpointing start-up capital availability as poor to mediocre, according to 61 percent of the firms surveyed. However, Sanghi is optimistic that the lack of venture capital will be less of a problem in the future.

"The availability of risk capital has been the largest problem in Arizona in the last decade," says Sanghi. "Arizona has had no venture capital fund based in Arizona."

He notes a few funds operate out of California and Colorado, with one or two people located in Arizona to oversee operations. But, he says, all of that is starting to change.

"We hold a yearly venture capital conference at the Biltmore," says Sanghi. "At each conference we feature 10 of Arizona's best and brightest through the screening of 60 to 70 companies. We bring in 300 to 400 venture capitalists from around the country, and they can get these 10 ideas presented all in one day."

Sanghi is excited about the prospect of creating venture capital sources here in Arizona to continue the already positive growth in high-tech.

"I expect over the next five years there will be some home grown venture capital funds," he says. "And banks have begun playing a larger role than in the past in starting to fund risk capital."

The future outlook for Arizona's high-

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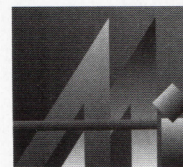
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tech industry is rosy indeed. More than 5,000 jobs are expected to be added to the high-tech industry over the next five years. And numerous projects are now underway.

- Intel is currently building one of the largest industrial plants under construction in the United States. The Chandler site will be a 1.5 million-square-foot computer chip facility. Once opened, in 1997, Intel will add 2,000 more people to its payroll.
- Motorola currently has three expansion projects underway that will add another 1,000 people to its work force.
- SGS Thomson Microelectronics, Inc. is opening a new plant in Phoenix that will add 600 jobs to its rolls.
- Olin Corp. recently began construction on a \$30 million manufacturing plant in

**The world's
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Mesa that will eventually employ more than 600 people.

Because Arizona's high-tech industry is driven by consumer demand and managed by people that truly care about the industry, it should see continued growth into the next century. The world's insatiable demand for semiconductor and electronic parts shows no sign of abating, with the demand for high-tech products and services expected to grow to unprecedented levels.

And with Arizona's strong economic outlook and growth of small business, the high-tech field's ancillary businesses will continue to benefit, boosting the entire industry as a whole.

It all adds up to an industry that is poised to not only meet but exceed future demands and expectations. It is an exciting time to be in high-tech.

AB

Cynthia Scanlon is a Tempe based freelance writer.