



*Industry Report Series*

**2006  
Technology and Innovation Report**

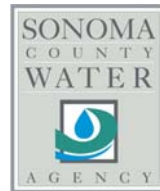
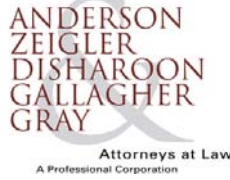


*Presented by the Sonoma County Economic Development Board, in partnership with the Sonoma County Workforce Investment Board*





**With Acknowledgment and Appreciation to the Underwriters of the  
Economic Development Board Foundation Research Initiatives Program  
Sonoma County Permit & Resources Management Dept. ■ Community Development Commission  
■ Sonoma County Health Services ■ Sonoma County Transportation & Public Works**



# **Sonoma County 2006 Technology and Innovation Report**

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# 2006 Technology Report

September 2006

The Sonoma County Economic Development Board (EDB), in partnership with the Sonoma County Workforce Investment Board (WIB), is pleased to bring you the 2006 Technology and Innovation Report. Our research partner, Moody's Economy.com, produced a portion of this report for the EDB.

Highlights from the 2006 Technology Report include:

- **A new technology pulse index which details the state of the industry in Sonoma.**
- **Technology industries across Sonoma County are having varied success. Most industry leaders in the area are experiencing higher profits,** but at the expense of reduced employment levels. The global expansion is supporting demand for the high-tech goods that the county produces, most notably telecom equipment, medical supplies, and measuring instruments.
- **The outlook for the telecom equipment industry is bright,** even better than a year ago, despite employment losses. Manufacturers are benefitting from the continued expansion in wireless and internet access equipment.
- **Tech companies have been lowering costs through improvements in productivity and decreases in the level of employment.** Labor is bearing the bulk of these cost cutting measures, as the industries show little interest in increasing their payrolls. According to our estimates, employment in high-tech industries across Sonoma County, such as medical supplies, telecom equipment, and measuring equipment have been down for the past several years.
- **The expansion of the U.S. economy is paying dividends for high-tech companies, as business investment is strong across industries.** Telecom equipment has witnessed a turnaround from its prolonged drought. The value of shipments from communications equipment manufacturers is expanding at a nearly 12% rate on a year-ago basis, a far cry from the contraction that started in 2001 and lasted into 2005.

Thank you for your continued interest in the Economic Development Board's research. As always, if you have any questions, please feel free to contact us at (707) 565 - 7170.

Sincerely,



Ben Stone  
Executive Director

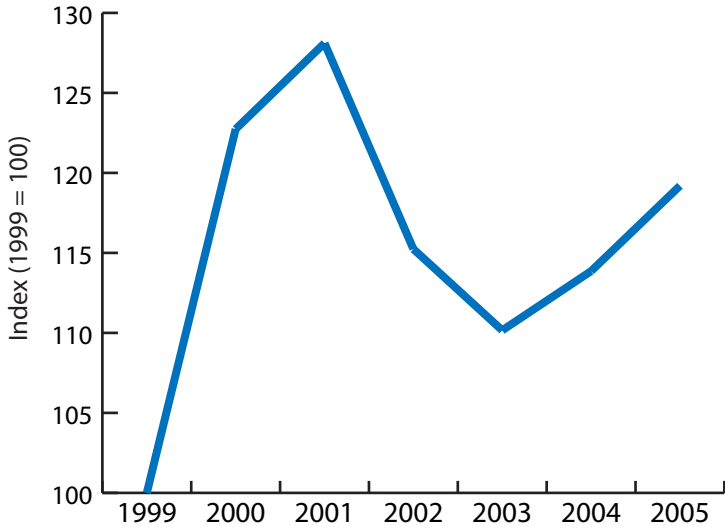
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# 2006 Technology Report: Sonoma County Statistics

## Technology Industry Pulse Index



Source: Sonoma County Economic Development Board

## Technology Industry Pulse Index

The Sonoma County "Technology Industry Pulse Index" shows the current trends of several key measures of the local technology sector. The index combines three statistics - local technology employment, local technology output, and national technology investment - in varying proportions based on their volatility, with more stable statistics given more weight.

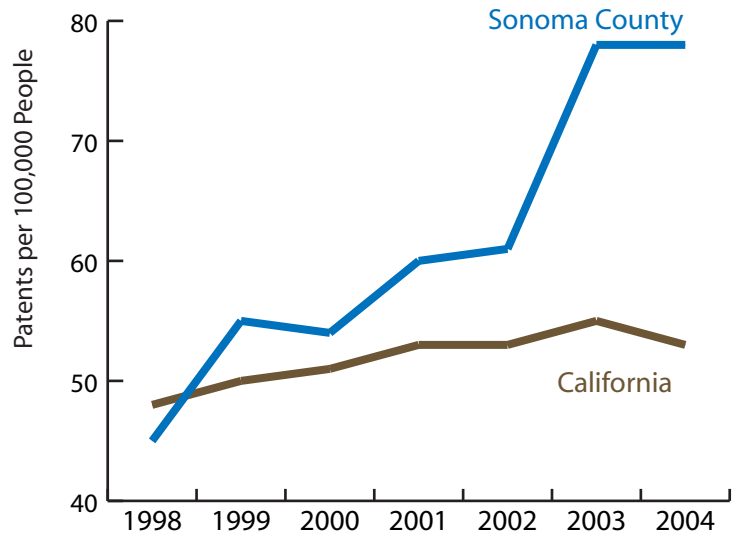
Currently, the index is weighted in the following approximate proportions: Local Technology Employment - 36%, Local Technology Output - 26%, National Technology Investment - 38%.

The index shows a peak in the local technology sector in 2001, followed by a two-year decline and, starting in 2003, a resumed expansion.

## Patents

From 1998 to 1999 the per-capita patent grants issued in Sonoma County surpassed the per-capita patent grants for California. Since 1999 Sonoma County's per capita patent grant issuance has increased greatly; in fact, in 2004 Sonoma County had 30 more patent grants per 100,000 people than California. After the tech bust, patent grant issuance for Sonoma County substantially rose from 2002-2003.

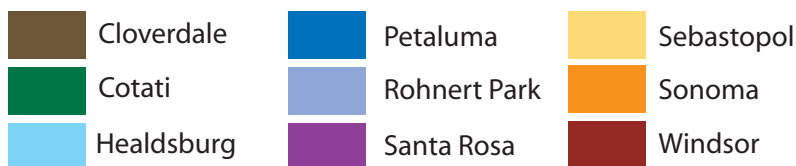
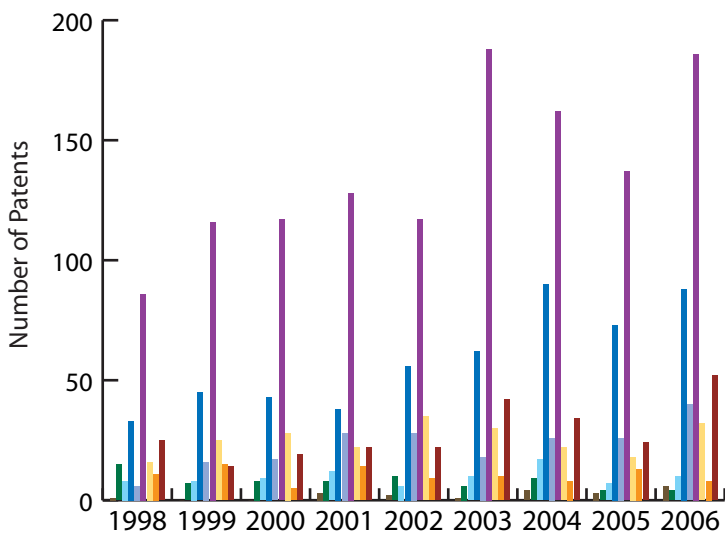
## Patents Per Capita



Source: U.S. Patent and Trademark Office

This graph illustrates the distribution of Sonoma County Patent Grant issuance by city. As the largest city in Sonoma County, Santa Rosa has led the patent grant issuance for the county from 1998 to 2006.

## Issued Patents by City

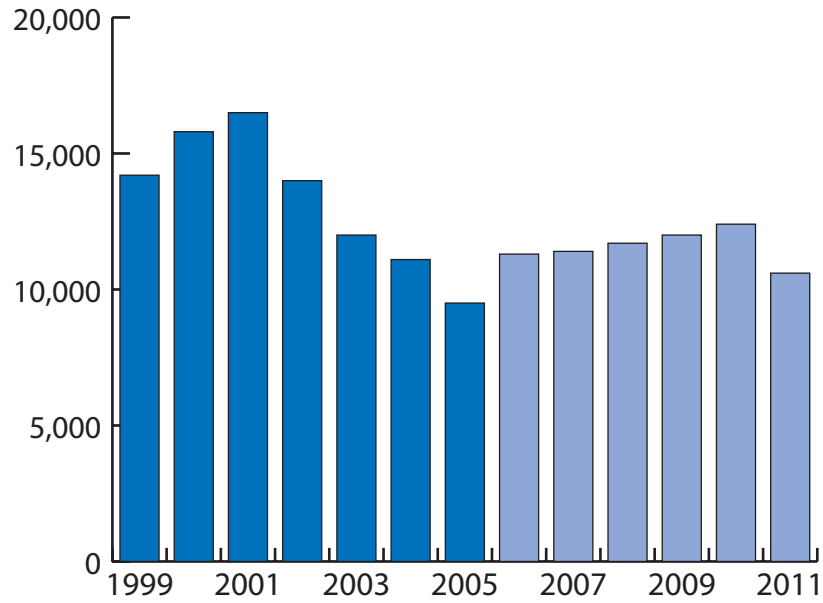


Source: U.S. Patent and Trademark Office

## Employment and Output

Tech employment in Sonoma County hit a lull in 2005, falling below 10,000 employees, but Economy.com has projected that employment levels should rebound in the next five years rising above 12,000 in 2010.

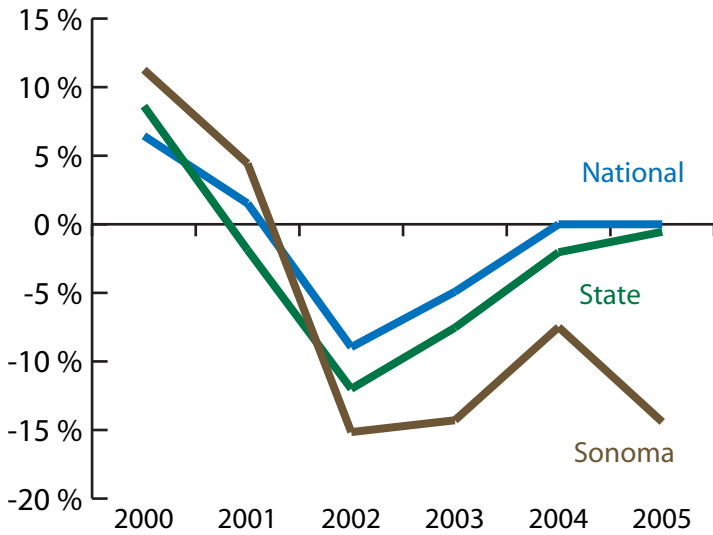
## Sonoma County Technology Employment, Historical and Projected



Source: Moody's Economy.com, "Sonoma County on the Mend," June 2006

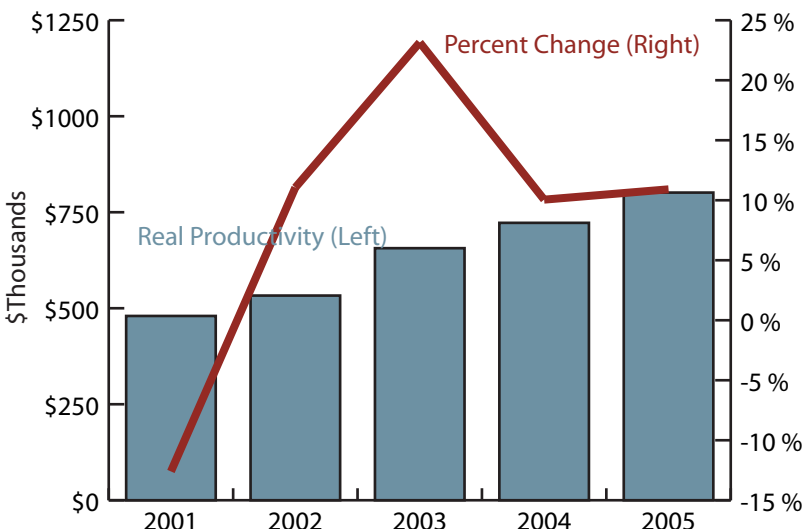
The side graph shows the changes in employment growth for county, state, and national levels. California and national employment growth have rebounded the last few years since 2002 and both are expected to grow in the coming years. Sonoma County's employment growth has not steadily rebounded and still faces negative employment growth. In June 2006 Boston Scientific, which last year purchased the promising medical device maker Trivascular, closed its 270 employee Santa Rosa division.

## Tech Employment Growth Rate



Source: Moody's Economy.com, "Sonoma County on the Mend," June 2006

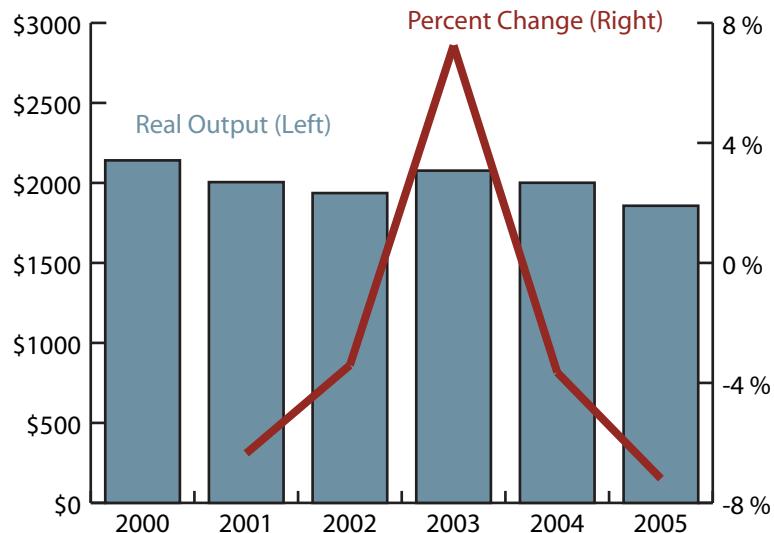
## High-Tech Real Productivity (Output per Worker)



Source: Moody's Economy.com, "Sonoma County on the Mend," June 2006

Productivity levels in Sonoma County have risen steadily since 2001. Positive growth is still occurring but has slowed down in the last two years.

## High-Tech Real Output (Gross Product)

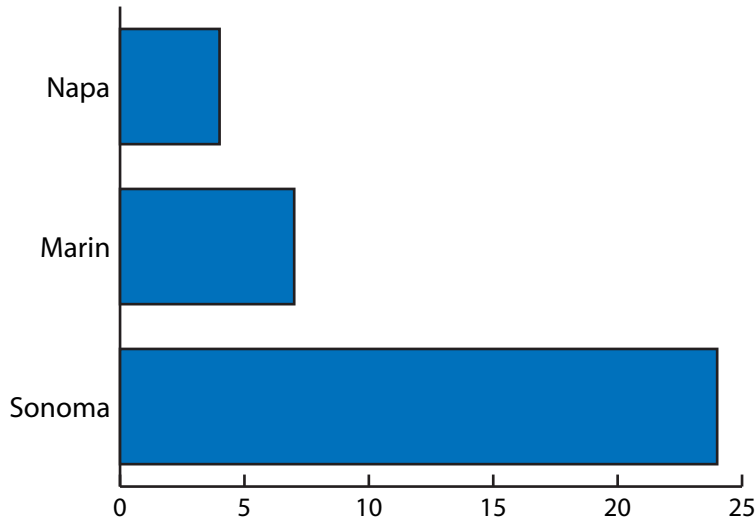


Source: Moody's Economy.com, "Sonoma County on the Mend," June 2006

After a sharp increase in Sonoma County's High-Tech Real Output in 2003, output has been slowly on the decline and faces negative growth.

# 2006 Technology Report: Sonoma County Statistics

## North Bay Biz "Top 500" Companies, Technology



Source: North Bay Biz Magazine, "Top 500"

## Top 500

Sonoma County had more tech companies represented in the North Bay Biz magazine "Top 500" list than any other North Bay county. The North Bay Biz Magazine "Top 500" ranking is based on a company's earned revenue for 2005.

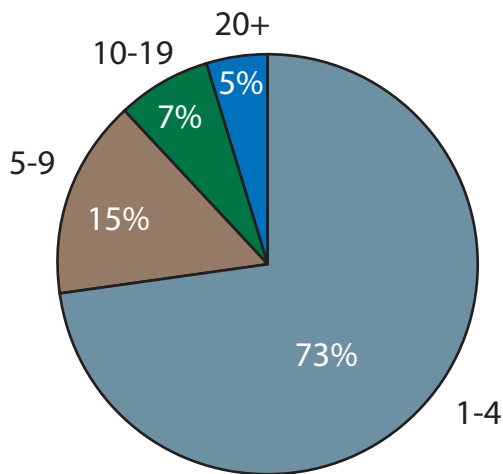
Agilent	Microsource
BIW Connector Systems	Micro-Vu Corp.
Calix Networks	Multi-Contact USA
Chouinard & Myhre	Precision Navigation Inc.
Cisco	Rheodyne
Immecor Corp.	Schurter Inc.
JDS Uniphase	Sonic.Net
Labcon	Symmetricom
LEMO USA	Tegal Corporation
Marketlive	Tellabs
Masterwork Electronics	World Products Inc.
Medtronic	Xandex

## Employment

These two pie charts illustrate the division of tech-related businesses within Sonoma County by employment size in 1998 and 2003. In both charts the amount of tech related businesses with 1 to 4 employees is the overwhelming majority. Also, in both years companies with more than 20 employees represented the smallest percentage of Sonoma County businesses.

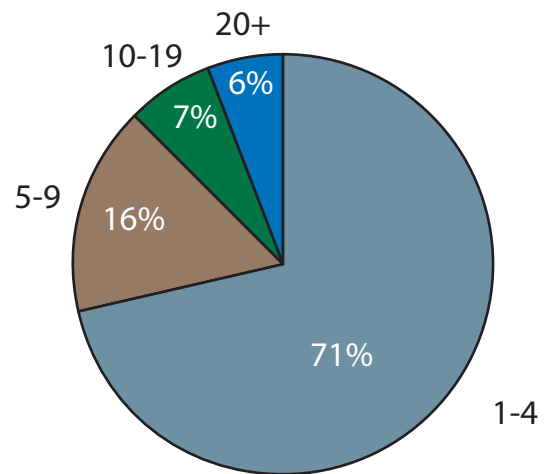
Although neither graph depicts the division of businesses at the height of the tech boom, the 2003 chart is very similar in its percentage division to 1998 after the decline of the technology sector.

### 1998 - Division of Businesses within Sonoma County by Employment Size



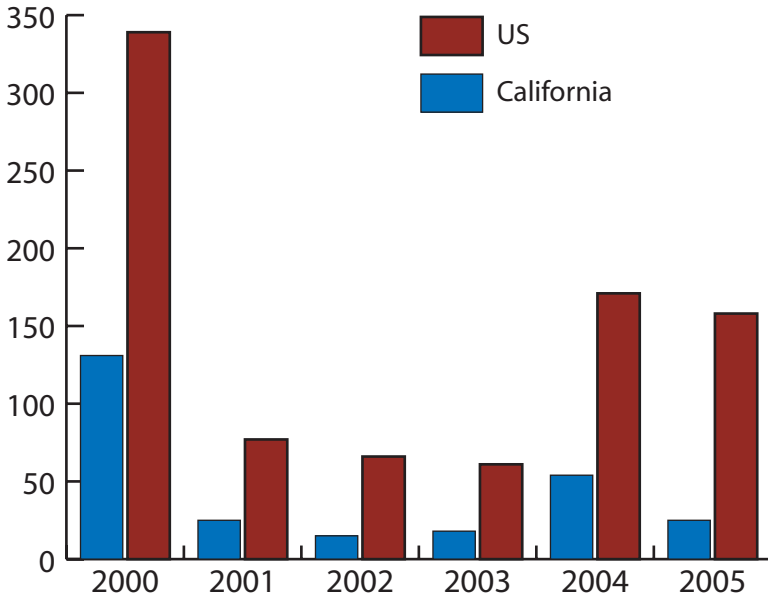
Source: U.S. Census Bureau

### 2003 - Division of Businesses within Sonoma County by Employment Size



Source: U.S. Census Bureau

## Promising Industries: IPOs, California and US



Source: Wilmer Hale, 2005 IPO Report

## Initial Public Offerings

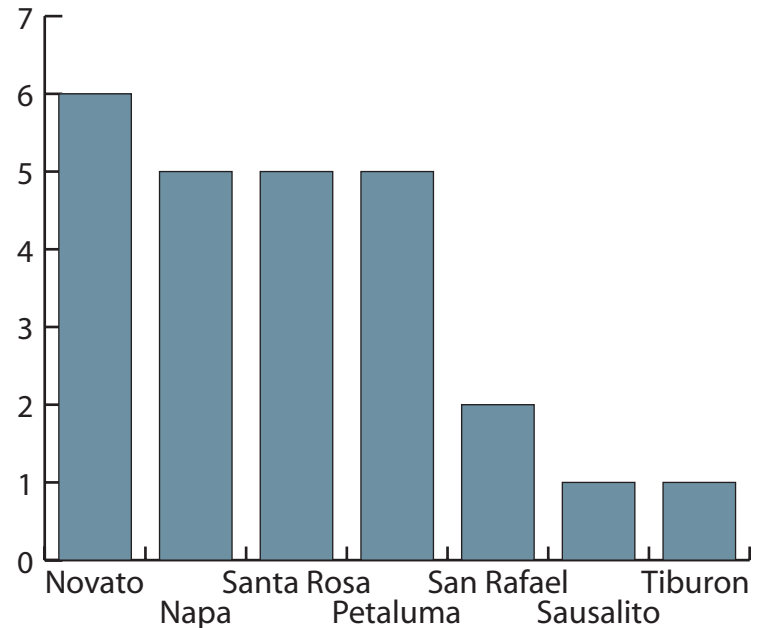
During the dot-com bubble of the late 1990's many venture capital funded companies were started and, seeking to cash in on the bull market, quickly offered IPOs. Usually, stock price spiraled upwards as soon as a company went public, as investors sought to get in at the ground-level of the next potential Microsoft. As reported by Wilmer Hale LLP, IPOs fell by 77 percent nationwide and by 81 percent in California from 2000 to 2001 to begin the dot-com bust. The last two years have seen an increase in IPOs over 2003 levels.

Biotechnology is defined as a technology based on biology, especially when used in agriculture, food science, and medicine. The North Bay is home to more than 25 biotechnology companies. Comparative data shown in the chart indicates that a significant number of North Bay biotech companies choose to operate in Sonoma County.

The following pie charts depict California's various shares of the Biotech industry. California has 28 percent or 410 of the total 1,457 biotech companies in the US, employing 43 percent of the United States biotech workforce.

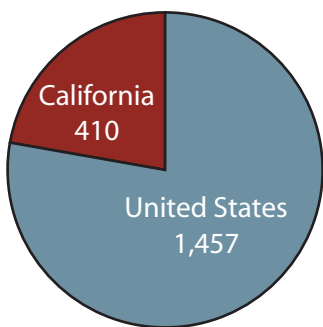
As a state, California has the largest amount of biotech revenue and research & development spending in the nation: 53 percent of total US biotech revenue and 47 percent of total US R&D spending.

## North Bay Biotech Companies

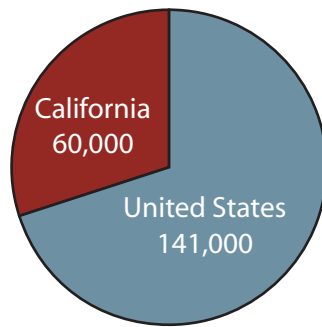


Source: North Bay Business Journal, 2006 Book of Lists

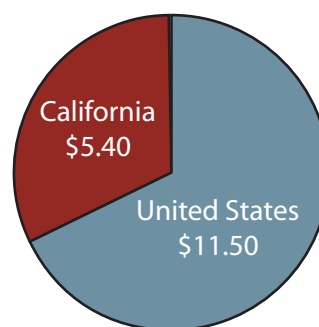
### Biotech Companies



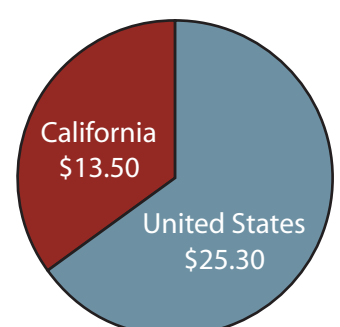
### Biotech Employees



### Biotech R&D (\$Billions)



### Biotech Revenue (\$Billions)

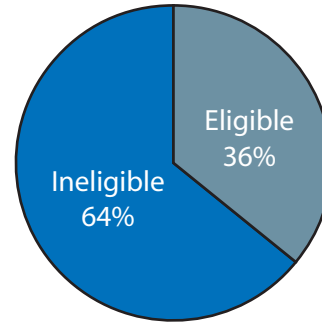


## Education

The percent of Sonoma County high school graduates that meet the UC/CSU eligibility requirements has hovered around 35 percent for the past 5 years.

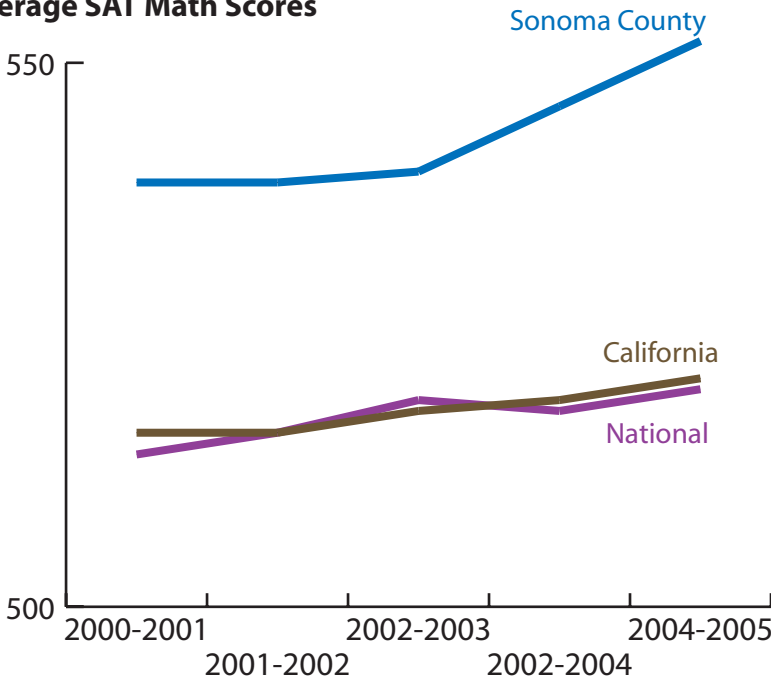
A number of Sonoma County public high school graduates attend SRJC before transferring to UC/CSU, and these students do not have to meet UC/CSU requirements at the time of high school graduation.

## Sonoma County Public High School Graduates' UC/CSU Eligibility, Class of 2005



Source: CDE Dataquest

## Average SAT Math Scores

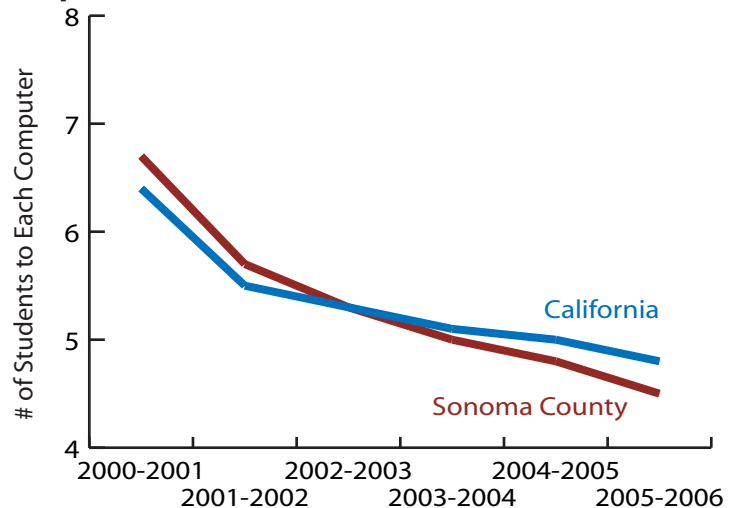


Source: CDE

Sonoma County's average SAT math scores have remained well above the national and California state averages for the past 5 years. In the 2004-2005 school year Sonoma County's average SAT math score of 552 was more than 30 points higher than the national and California State average.

For the past five years the ratio between the number of students and number of computers has been improving for both Sonoma County and the State of California. Since 2003 California has had a slight advantage with a ratio of 4.5 students to every computer as compared to Sonoma County's 4.8 students to every computer.

## Computer-to-Student Ratio

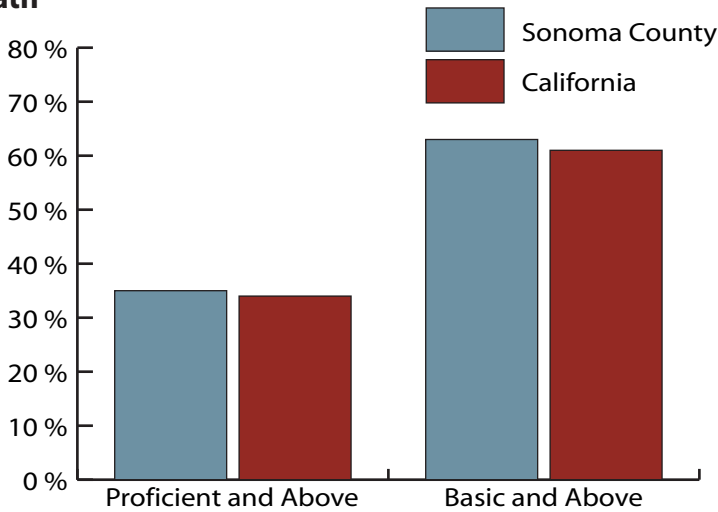


Source: CDE

# 2006 Technology Report: Sonoma County Statistics

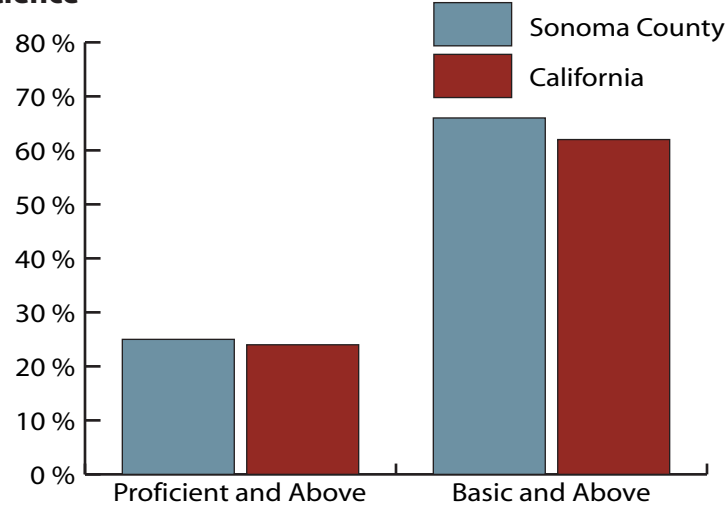
These bar graphs illustrate Mathematics (for all grade levels) and Science (high school) Testing Assessment Data for the 2004-2005 school year. These graphs indicate that both science and mathematics testing data in Sonoma County is slightly higher than the California averages. These graphs also show that of those students tested in Sonoma County, 98 percent were at or above basic and proficient math competency while 91 percent were at or above basic and proficient science competency levels.

## Math



Source: CDE

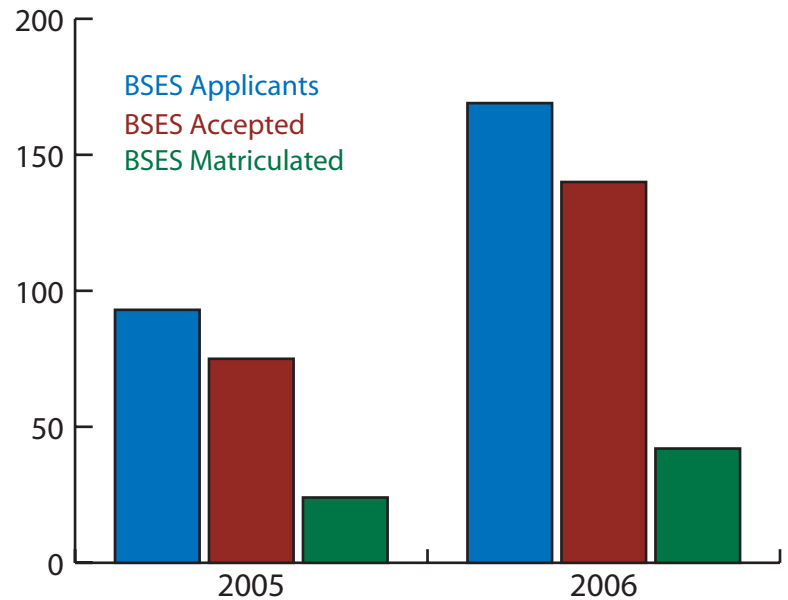
## Science



Source: CDE

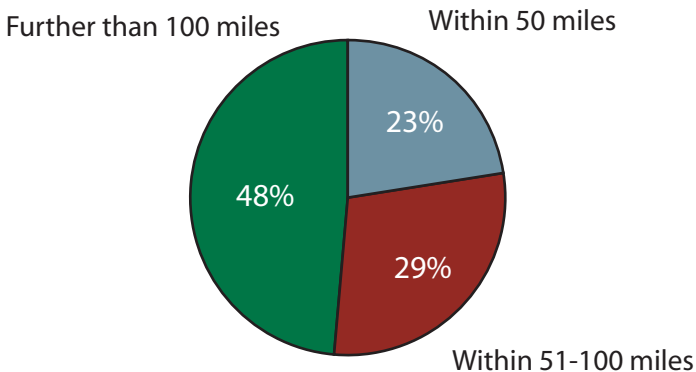
## Sonoma State University (SSU) B.S. Engineering Science Degree Enrollment in 2005 and 2006

In the Fall of 2005 Sonoma State University began offering a Bachelor degree in Engineering Science (BSES). The first year 93 students applied for the program, 24 matriculated, and 19 finished the BSES curriculum for the year. This past spring student applications for the BSES program rose by 45 percent, with 169 students applying for the program. Future projections look very promising as SSU hopes to have 180 students enrolled in the program by 2010.



Source: SSU

## Distances from Santa Rosa of 2006 BSES Program Applicants



48 percent of the students that applied to the BSES program are from geographical areas of 100 or more miles from Santa Rosa. This figure shows that this new degree program is attracting students from outside of the bay area.

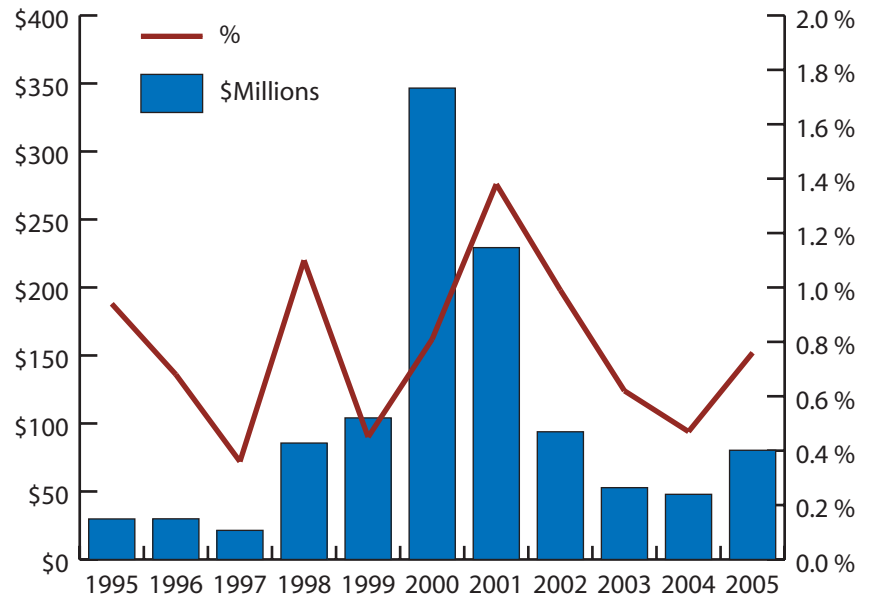
# 2006 Technology Report: Sonoma County Statistics

## Innovation

Northern California Venture Capital (VC) investment is only a small percentage of California's total VC investment. The total amount of VC investment in Northern California peaked in the year 2000 and has decreased in the subsequent years. Despite a lull from 2003-2004, 2005 saw a rise in VC investment, and this positive trend could continue in upcoming years.

The following series of graphs illustrate the amount of different types of VC investment in Northern California including: Start-up/Seed, Early, Expansion, and Later Stage Venture Capital.

## Venture Capital Investments received by Northern California Companies and as a Percent of Total California Venture Capital Investments, 1995-2005



Source: PriceWaterHouse Coopers, MoneyTree Report

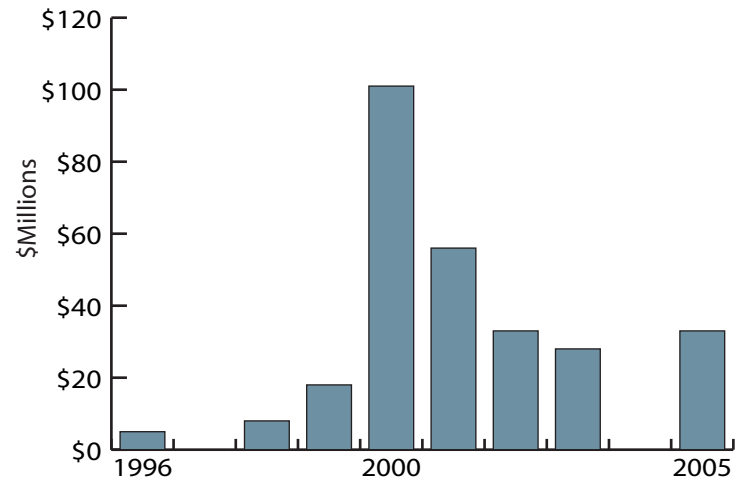
## Northern California Venture Capital Investments

### Start-up/Seed



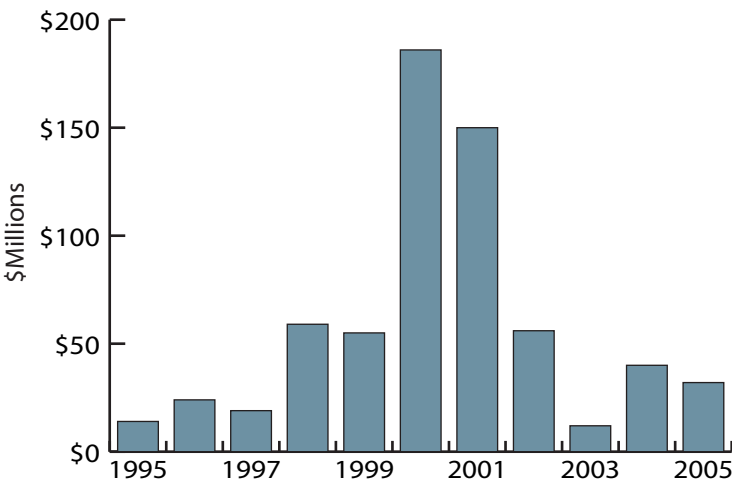
Source: PriceWaterHouse Coopers, MoneyTree Report

### Early Stage



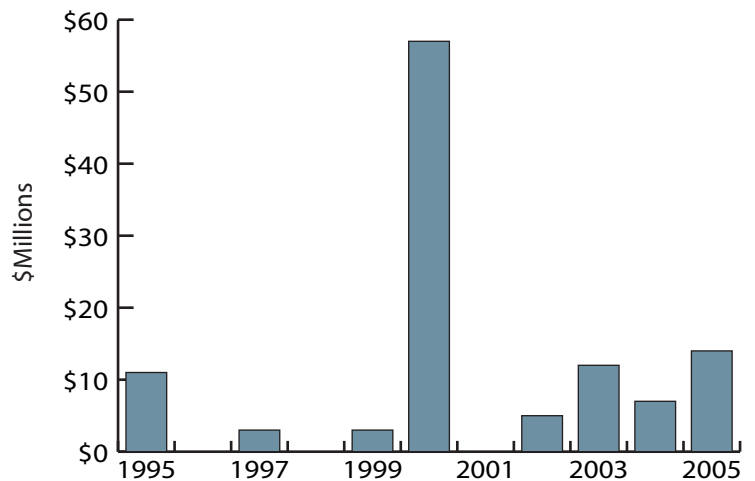
Source: PriceWaterHouse Coopers, MoneyTree Report

### Expansion Stage



Source: PriceWaterHouse Coopers, MoneyTree Report

### Later Stage



Source: PriceWaterHouse Coopers, MoneyTree Report

# Tech Industry - Sonoma County

**Recent Trends.** Technology industries across Sonoma County are having varied success. Most industry leaders in the area are experiencing higher profits, but at the expense of reduced employment levels. The global expansion is supporting demand for the high-tech goods that the county produces, most notably telecom equipment, medical supplies and measuring instruments.

The outlook for the telecom equipment industry is bright, even better than a year ago, despite employment losses. Manufacturers are benefiting from the continued expansion in wireless and internet access equipment. The latter is especially important in Sonoma County. Telecommunications companies, such as AT&T and Verizon, are broadly seeking to enhance their infrastructure and expand their product offerings (Internet Protocol Television for example). Calix, a local telecom equipment provider, is making great strides to meet this demand head-on. Since the beginning of the year, the privately-owned company has released new fiber-to-the-node and fiber-to-the-premises products to service these needs. Gains in the industry have not been without consequence though, as several area firms are cutting back on employment costs. Tellabs is laying off workers for the second straight year, and Next Level Communications is shutting down entirely. Employment in the tech equipment manufacturing industry in Sonoma County has shrunk by more than 15% in the past year; the industry is now about two-thirds of the size it was at its peak in 2000.

Nationally, the medical supplies industry is sustaining revenue growth, though product recalls and regulatory scrutiny continue to adversely impact producers. Consumer spending on medical services remains strong, but building inventories has some producers rolling back production. The leading driver of the industry in Sonoma County is heart disease, and this persists as a national problem. According to the American Heart Association, the cost of cardiovascular disease and stroke is expected to reach over \$400 billion in 2006. Medtronic Vascular is at the forefront of the business to combat vascular disease. The Endeavour Drug-Eluting Coronary Stent has already been approved for use in Europe and generated

\$59 million in revenue in 2005. The stent is expected to get approval by the Food and Drug Administration (FDA) sometime in 2007.

Confidence in the measurement industry remains high, as a strong global economy is supporting high profit growth. Sonoma County has a wealth of resident experts in this field, and the rest of the industry is starting to take notice. Several competitors of Agilent Technology have opened satellite offices in the area to take full advantage of the county's comparative advantage. National Instruments Corporation is opening a research and development office in the area that is expected to employ 20 within a year's time. In addition, several others are already present in the market, including Venture Corporation of Singapore and Keithley Instruments of Cleveland, Ohio.

**Macro Drivers.** The expansion of the U.S. economy is paying dividends for high-tech companies, as business investment is strong across industries. Telecom equipment has witnessed a turnaround from its prolonged drought. The value of shipments from communications equipment manufacturers is expanding at a nearly 12% rate on a year-ago basis, which is a far cry from the contraction that started in 2001 and lasted into 2005.

Telecoms are ramping up investment spending as they lay the groundwork for expansion across the country of broadband and wireless services. Steady job growth through 2006 should support strong demand for telecom services and, consequently, the equipment produced in Sonoma County.

Demographic and income trends are two of the key macro drivers for the medical supplies industry. In the U.S. and other developed nations, the growing share of the elderly population will lead to expansions in medical care. In addition, the persistent problem of obesity will increase further demand for cardiac devices like those manufactured by Medtronic. Income growth in emerging markets will lead to an expanding customer base for U.S. device makers, helping to lengthen product life.

Global exchange rates are an important factor in the trade of any international products, including high-tech. The gains made by the U.S. dollar against European currencies late last year have nearly disappeared. The dollar has also depreciated against several Asian currencies, the Chinese

Yuan in particular. A weak U.S. dollar makes domestic goods more price-competitive, helping to moderate the difference in production costs between the U.S. and its foreign competitors.

**Industry Drivers.** Federal regulation is one of the major issues facing the telecom equipment industry going forward. The current debate on Capitol Hill over telecom reform is seemingly at a stand still. The major issue at stake is franchising rights, but the Senate and the House are offering up different solutions. The telecoms are currently limited in where they can roll out their new services without costly negotiations with local municipalities. If national franchising rights come about, this could mean sweeping infrastructure upgrades by the telecoms. The key new service is IPTV, which would complete the telecoms ability to service all of the consumers' voice, video and data needs. This would prove to be a windfall for the Sonoma area telecom equipment manufacturers, which are well positioned in the marketplace.

A hurdle to the medical supplies industry is the prospect of future recalls. Recent product failures have led to increased scrutiny by the FDA, which could lead to increased costs as medical supply firms are burdened with increased product monitoring responsibilities. However, this will likely have less of an effect on the producers of cardiac devices of the likes made in Sonoma County. These producers generally already carry out well-documented, large scale clinical trials such as the current Endeavour IV clinical study by Medtronic.

**Pricing.** Prices in the telecom equipment industry continue to retreat. This downward trend has eased over the past year, due to improving demand through ongoing investment by the telecoms, but excess capacity and heavy competition limit pricing power throughout the industry. Prices, according to the PPI, have been declining at a roughly 1% annualized rate for each of the past six years.

The effects of regulation play a large role in the pricing power of the medical supplies industry. The threat of a proposed change in Medicare payments for certain medical devices is over now. The Bush Administration backed off on the changes that would have effectively seen the price of many medical devices slashed by upwards of 30%. Instead, they have opted for more modest changes in the pricing scheme, which will see more

modest drops. The new rule takes effect in early October and is largely considered a win for device companies such as Medtronic.

A potential blow to pricing power among medical suppliers would be the legalization of gain-sharing plans. These are an arrangement between hospitals and doctors wherein the two work towards limiting or standardizing the devices used in surgery. This would increase bargaining power among hospitals when negotiating deals with suppliers. These types of agreements were ruled illegal in 1999, but have since begun to make a comeback due to several programs being approved by the Office of the Inspector General.

**Operating Expenses.** Tech companies have been lowering costs through improvements in productivity and cutting jobs. Labor is bearing the bulk of these measures, as the industries show little interest in increasing their payrolls. According to our estimates, employment in high-tech industries across Sonoma County have, in general, been down for the past several years.

JDS Uniphase, a producer of thin-film technology, has come to grips with unsustainable cost burdens. The company is selling off its property in the area and consolidating operations into a portion of their existing campus. The company is refocusing and, as such, is cutting 300 of its 800 positions. These types of restructurings are now commonplace among tech suppliers.

Higher input costs are weighing on tech equipment manufacturers. High crude oil prices have resulted in higher costs for petroleum-based inputs, such as plastics. The substantial pricing power of the producers of input products has forced tech manufacturers to absorb much of the price increases.

In the medical supplies industry, companies are saddled with additional costs due to the Medical Device User Fee and Modernization Act. The act's purpose was to improve the efficiency of delivering new innovations to the market, but its implementation has led to difficulties. A shortfall in funding from Congress has leveled much of the additional expenses on the suppliers themselves, resulting in higher product development costs.

**Profitability.** Stable demand and cost cutting across high tech industries has led to improved industry profitability. In the near term, the bottom line of telecom equipment manufacturers should be buoyed by increased business investment and the infrastructure buildup by the Baby

Bells. This will, however, be moderated by increased competition from abroad forcing domestic manufacturers to live with slimmer margins. The growing medical supplies market will be lifted by the aging of the baby boomers and the prospect of new sales in emerging markets.

Specialization seems to be a growing trend among high tech firms. JDS Uniphase's string of downsizing came, in part, from its exiting of the TV light engine business to pare down the extraneous portions of its business model. Similarly, Agilent sold off their semiconductor products business and is spinning off their semiconductor test business into an independent company. With margins in the tech business largely decided by the flow of new products, this trend towards specialization will spur innovation and profitability in the medium term.

**Long-Term Outlook.** High-tech industries will have a harder time competing with lower-cost regions of the world. Although this trend is not unique to Sonoma County, the region's higher costs make manufacturing all the more difficult. Thus, the region's long-term advantage lies in innovation. Though the U.S. still has a formidable lead in engineering talent in the world, other countries are fast closing the gap. China is graduating five times the number of engineers as the U.S. New companies are continually starting up in the economy, but once growth reaches a state where the manufacturing or service can be performed in a more cost-effective way elsewhere, the jobs will likely leave and the cycle of investment and innovation will start again. For example, although Ireland will eventually surpass Sonoma County as Medtronic's producer of stents used in heart repair, research and development will likely remain in the U.S.

Going forward, technological advances, easing of regulatory barriers and demands for data, internet and wireless services all bolster the long-term outlook for communications equipment companies. Telecom investment will eventually return to more sustainable levels, with growth tied more closely to carriers' cash flows. In the meantime, some segments of telecom equipment have stronger prospects, namely broadband, IP technologies, and wireless.

**Upside Risks.** Widespread recognition of WiMax, the newest wireless format,

would certainly be a boon for the telecom industry but not as much as Wi-Fi has been. WiMax has the ability to send signals over miles, not the feet that currently limit Wi-Fi access. This means that the industry would sell fewer units, although it would certainly try to compensate by charging a higher price.

Helping to cement the county's position as a hot bed for R&D is the possibility of a new graduate program in biotechnology at Sonoma State University. The process is still in its early stages, but the existing infrastructure at the university, due to its engineering program and community links, make this sound like a viable option. This development would open the door for research partnerships with area firms and further solidify the area's talent pool of biotech expertise.

Tech-based curricula, through Sonoma State University's masters program in computer and engineering science, generate further upside potential to provide personnel needed for local tech industries. Its undergraduate program in engineering science commenced last year, adding to local workforce quality and completing the stream of tech-based curricula that is also available at the junior college and high school level.

The marriage of TriVascular Inc. and Boston Scientific is over. This, after the latter decided to part ways with their aortic aneurysm system and, with it, the 270-employee Santa Rosa division. However, investors, including TriVascular's founder, are trying to keep the biotech company going and the facility operational. Their success would offer continued stability for biotech in Sonoma County and keep talent in the area that may have otherwise left.

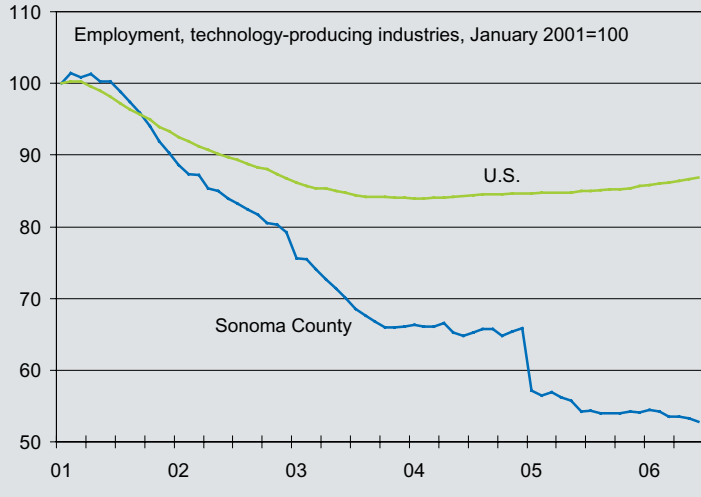
**Downside Risks.** The growing share of out-of-pocket contributions by consumers for healthcare is a risk to the outlook of the medical supplies industry. This trend will effectively raise the price for the consumer, potentially curbing their demand for superfluous medical devices. In addition, efforts to constrain government spending on healthcare may adversely affect the introduction of more advanced equipment.

Consolidation among service providers presents further downside risk. If only a handful of telecom services firms are purchasing equipment, they would enjoy more bargaining power over prices.

*Andrew Gledhill  
August 2006*

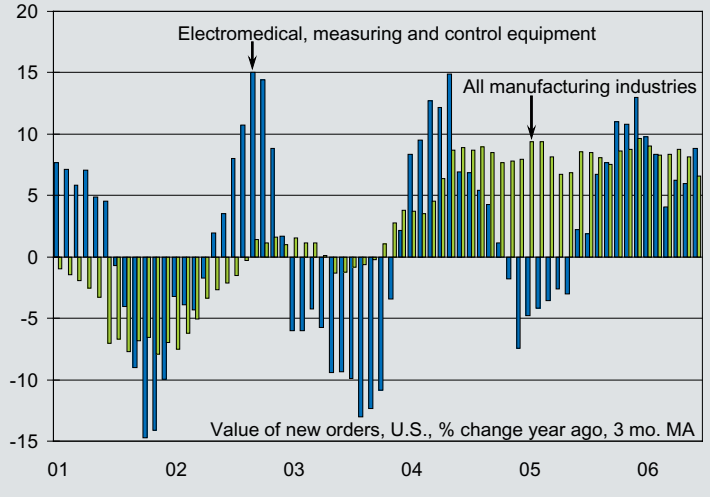
# Tech Industry - Sonoma County

**Cost-Cutting Measures Stripping County of High-Tech Jobs**



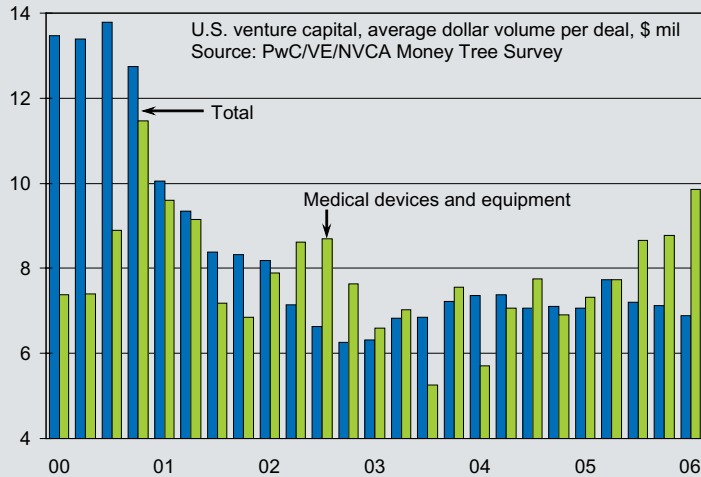
Increased worker productivity and offshoring have been leading to nationwide employment losses in high-tech industries. This has been compounded across Sonoma County due to the area's high concentration of tech-producing firms. Development in foreign nations has been a hurdle to domestic workers; in many international markets, products can be manufactured not only of similar quality but at less cost as well. Going forward, the focus domestically will shift to more R&D and less production. There exists risk here too, however, as product development capabilities abroad are also improving.

**Cyclical Upturn in Orders Helping Secure Near-Term Profits**



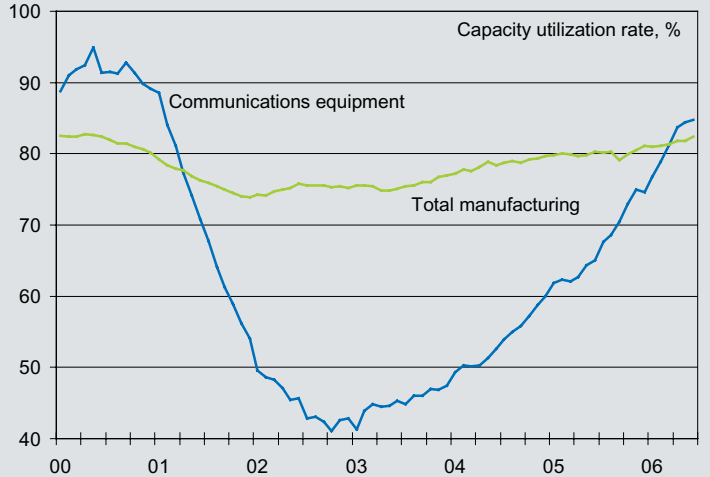
Orders for medical equipment have begun to recover and have been in the midst of a cyclical recovery since the middle of last year. In addition to the cyclical aspects of the change, orders are also being buoyed by the onset of global demand. Markets such as China and India, despite developing local expertise in the field, are still at a technical disadvantage to their American competitors and are large consumers of medical products. Medtronic's Endeavour Drug-Eluting Stent was recently approved in China, which has over a \$100 million a year market for this type of device.

**Ageing Population Spurring Investment Interest in Medical Devices**



Venture capital flows in the medical supplies and devices industry are strengthening. This industry has been the third highest recipient of VC funding so far this year, as total financing has surged by about 62% on a year-ago basis. VC funding is an important factor for these companies, as it provides the means by which smaller startups can furnish R&D expenses. Smaller firms often deal primarily in R&D, with their successful patents being purchased by larger companies with greater resources. This helps to provide ample innovation to take advantage of the expanding customer base.

**Ramp Up by Telecoms Benefiting Equipment Makers**



The capacity utilization rate of communications equipment manufacturers has surpassed the national average for the first time since 2001. Shipments are steadily increasing, as orders in the industry have stabilized. Global demand is growing, and American confidence in tech investments is rebounding from the fallout of the tech bubble burst, leading to budding infrastructure investment. These seeming capacity constraints will lead to capital investment across the industry, but it is unlikely that there will be a recovery in employment levels.

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